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BRIEFLY TOLD.

LOWER RATES AND MUNICIPAL OWNERSHIP.—The universal clamor for lower rates for public utilities is being met by improved methods of production and greater economies, and the public is doing its part by its increased consumption of the articles purveyed. Frequently the reduction in cost to the consumer comes to him before he anticipates it, and usually voluntarily when the time is ripe for such reduction. If the matter were left between the purveyor and the people there would be less friction; but lower rates and municipal ownership, intricate in their detail but alluring on the surface, are furnishing the misled, ignorant or unscrupulous politician with a talisman which attracts the public itself, ignorant of the failures which have attended other communities stung with the same virus. The public does not like detail, but it is the duty of those interested in serving the public to see that they are properly instructed on the failures that have taken place, of the increased taxation to meet annual losses, of the abandonment of plants (*vide* the municipal gas plant at Hamilton, O., and others), and the miserable service given by the municipality. You have to meet the politician on his own ground; he teaches the people to suit his purposes, and his purpose is aggrandisement and office; you must teach the people the fallacy of his argument, and the real manner in which their interests as well as yours will be protected. It is the ignorance of these things and the glamor that lower prices and municipal ownership throw, not the knowledge of the truth that causes the people to follow false gods, and it is only the rude awakening they get when their pockets are touched to make up deficiencies that discloses to them the difference between facts and campaign talk. The people do not know the facts; they must be taught, and this takes time and effort; but for the protection of the vested interests of men who staked their money in these enterprises when they were risks, it is your duty to give the matter the attention that it demands. When a man invests his money in a farm, and by scientific management it increases in value, he is left in safe possession of it; why should his investment in a public utility, increased in value by proper management, be any less safe? The subject is getting more and more in the eye of the public, and every gas man should be properly posted on its every phase.

NOTES.—

THE Ann Arbor (Mich.) Gas Company has increased its capital stock from $200,000 to $350,000 and proposes to make many improvements this summer.

THE Lawrence (Mass.) Gas Company has purchased a large piece of land on Marston street for its contemplated works improvement.

EAST DUNDEE, ILLS., will have gas supplied from Elgin; so will Carpentersville.

THE Cannaut (O.) Gas Light and Fuel Company has ceased to do business. Natural gas was too much for them.

THE San Diego (Cal.) Consolidated Gas and Electric Company is planning large improvements for this year.

THE Denver (Col.) Gas and Electric Company, having secured a 20-year franchise on account of their concessions in the matter of price,

SMITHSONIAN DEPOSIT

etc., contemplates very extensive improvements in both gas and electric light plants. High pressure boosting and low pressure distributing mains and new apparatus will be installed. An investigation was started as to the legality of the recent elections, at which time the gas company obtained its franchise, and Mr. Henry L. Doherty, President of the Gas Company, was arrested on his refusal to give testimony. He was very soon released, however, on his own recognizance and an injunction was put in force restraining the judge from continuing the investigation.

HYATTSVILLE, MD., has granted the Hyattsville Electric Light Company a franchise to erect a gas plant in that town.

THE Census Bureau has issued a preliminary summary of the statistics of manufactured gas for the United States for the calendar year 1904 as compared with 1900, the year of taking the twelfth census, according to which there were in operation in 1904, 1,017 establishments, an increase of 16 per cent. over 1900. The total value of gas manufactured was $125,036,055, an increase of 65 per cent. All other products, $13,272,434, an increase of 111 per cent.

THE Utah Gas and Coke Company, of Salt Lake City, Utah, has contracted for 50 miles of mains and is almost ready to begin actual operations on the construction of the plant. Mr. R. B. Brown is Consulting and Constructing Engineer of this Company.

IT is reported that Mr. John R. Walsh, who owned the Akron (O.) Gas Company, lost during 8 years the sum of $568,525, on account of natural gas competition. It will be remembered that there was an endeavor made by this Company to sell manufactured gas at 25 cents per 1,000.

GOVERNOR HIGGINS, of New York State, vetoed the Auburn, N. Y., dollar gas bill.

THE by-product plant of the Milwaukee Coal and Gas Company, at the foot of Greenfield avenue, Milwaukee, Wis., was destroyed by fire; the loss is estimated at $10,000.

IN accordance with the time honored custom in American cities, the Hamilton (O.) Municipal Gas plant has proved a failure and has been shut down to prevent further yearly loss, and is buying gas from the privately owned company of that city at 35 cents per 1,000. Isn't it time for Wheeling, W. Va., to investigate herself.

UNITED STATES Commissioner Shields has received a check for $204,000 from the Consolidated Gas Company and $37,000 from the New Amsterdam Gas Company, both of New York city, representing 20 per cent. of the Companies' estimated receipts for the present month, which was deposited in the Citizens Central National Bank until Judge Lacombe hears the argument upon the Companies' application for preliminary injunction, pending the suit in which the constitutionality of the 80-cent gas law will be tested. If the case takes it full legal course, 4 years will probably be consumed and $20,000,000 will be in the Commissioner's charge.

THE Newport News City Council has appointed a committee to report on the construction of a municipal gas plant in that city.

MR. JAS. B. EATON, of Rochester, N. Y., is made to say to a reporter: "We are forced to supply some *carbonated* water gas, as it is much more powerful than coal gas and not dangerous." That depends on how many fingers of each.

THE report of the Senate Committee of the District of Columbia, on the bill to tax public utility corporations of the District 12 per cent. of their net earnings in addition to the present tax, has been submitted.

THE Galesburg (Ills.) Railway and Light Company has offered to reduce the price of gas to $1.15 net, which is supposed will close the controversy between the town and the Company.

THE South Western Electrical and Gas Association has elected the following officers for the next year: President, H. S. Cooper, Galveston; First Vice-President, J. W. McLendon, Fayetteville, Ark.; Second Vice-President, J. P. Crerar, Denison; Third Vice-President, Samuel Kahn, San Antonia; Secretary, E. B. McGinnin, Dallas; Treasurer, A. E. Judge, Tyler. Executive Committee; H. S. Cooper, J. W. McLendon, J. P. Crerar, Samuel Kahn, M. M. Phinney, H. F. Edgar, J. F. Strictland, R. B. Stitcher, Frank S. Duffey, E. B. McGinnin. Finance Committee; F. M. Lege, J. J. King, W. H. Young. Advisory Committee; J. A. Farnsworth, H. M. Littell, J. D. Oliger, W. H. Chapman, C. W. Ford, C. H. Dunbar, E. D. Kelly, C. W. Kellogg, E. M. Cooper, David Daly, W. B. Wood.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 935.]

THE TWENTY-NINTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD IN CLEVELAND, O., MAY, 16, 17 AND 18, 1906.

FIRST DAY—MORNING SESSION.

The President—The next order of business is the

PRESIDENT'S ADDRESS,

and I will invite the Vice-President, Mr. Mitchell, to take the Chair.

Under Article I. of the By-Laws of the Constitution of the Association it is stated that "at each annual meeting the President shall present an address, setting forth his official acts and such general items and recommendations as he may deem of advantage to the Association."

Under Article IV. it is provided that the President "shall choose subjects and select authors for the papers which shall be presented for the consideration of the Association at its next annual meeting."

By virtue of this authority, at the time of my election to be President I presented to you an address containing a list of subjects and I now have much pleasure in presenting to you the authors and their papers for your consideration at this meeting. I wish to take this occasion to express my appreciation of the loyal co-operation of the members and friends of the Association, who by their efforts have made this programme of papers possible. The spirit of the Western Gas Association is the spirit of co-operation, of generous help, and is confined to no narrow section of territory. We have this year co-operation from Massachusetts on the East and California on the West, from Texas on the South and Minnesota on the North, together with the States within these bounds. Truly we are a great national Association, and these evidences of our energy and activity for the good of the gas industry have earned for us the right to sit in "the seats of the mighty," and to rank wiih the most industrious of our sister Associations. We are broad in our choice of subjects. We include gas engineering, manufacture and distribution, coal and water gas. We include commercial subjects, and we are honored to have a paper upon "The Relation of Gas to Our Modern Life," by Mrs. O. N. Guldlin, of Fort Wayne, Ind., the wife of one of our valued members. It is an uncommon tribute to our Association to be thus complimented. We include the utilization of residuals, and take up the ever present rate question. We show our interest in co-operation between engineering schools and our industry, and we are mindful of our obligations to our employees. We are fortunate in having with us a representative of the newly organized Illuminating Engineering Society, who will address us on the most important subject of illumination. We welcome this evidence of co-operation between the specialists in an association and those engaged in the general industry. It is not necessary for me to mention by title each paper, nor to comment upon their excellence, for you are the judges and jury. I commend the papers and the writers to your good offices and consideration and invite a full discussion. The floor of the convention is yours, the Chair only is mine, and I trust I shall be impartial in the discharge of my duties from the Chair. Let me at this time thank you again for the honor you have conferred upon me by election to be your President, and to assure you I am not unmindful of this mark of your esteem.

My "official acts" for the year have been confined to the prepartion of of the programme for this meeting. I believe it will not strain your conscience to give me a clean bill of health ratifying and confirming my "official acts." No great exhibition, such as the Universal Exposition of 1904 at St. Louis, has occurred, and there has been thus no great opportunity to bring the gas industry prominently to the foreground. The year has been, however, one of continued progress and prosperity to those who follow our calling. Never before has there been such activity in the commercialism of the gas business. Never before have the manifold uses of gas been brought so prominently before the public. We have learned how broad are the limits of our market, and expansion of our usefulness is the most characteristic sign of the times. And this ought to be natural, for the characteristic physical property of a gas is its tendency to expansion, and if we but expand the market, we are doing only what the product we sell has always been doing, tending to expand. The usefulness of the commercial engineer cannot be gainsaid, and in the management of gas properties to-day, it is the commercial engineer who is most in demand.

And while we are on the subject of commercialism I desire to present for your consideration a schedule of items covering the reasons which are determining factors for variations in gas sales. We know that the

variations in average sales amongst the various gas companies are from 40,000 cubic feet per consumer per annum to as low as 15,000 cubic feet per consumer per annum. A new standard which is not impossible of attainment is 60,000 cubic feet per annum per consumer. The prize is worth the candle, or shall I say the tip. The schedule represents the composite judgment of many skilled managers and is here submitted. The relative importance of the items is based on a decimal scale system, 100 representing the total of all the reasons given.

a.—New business or commercial department. Exhibitions and demonstrations. Aids to education of consumers. Maintenance department for light and appliances. Relative importance to count as 17.5.

b.—Character of service rendered by company. Candle power. Pressure of gas. Attention to complaints. Ability of management. Intelligence of employees. Relative importance to count as 17.

c.—Price of gas. The making of rates for light, heat and power. Relative importance to count as 12.

d.—Competitive conditions. Lighting. Fuel. Power. Gas wars. Natural gas. Relative cost of other materials for light and fuel. Extent of electrical service. Relative importance to count as 11.5.

e.—Nature of city. Manufacturing, commercial, residential, resort. Relative importance to count as 9.

f.—Character of population. Permanency. Intelligence of consumers. Standard of lighting and living. Relative importance to count as 9.

g.—Location of city. Size. Growth of population. Relative importance to count as 6.

h.—Nature of territory occupied. Extent of manufacturing, business and residence territory. Density of population. Policy as to extension of mains. Ability to make extensions. Relative importance to count as 6.

i.—Climatic conditions. Hot. Cold. Sunshine. Rain. Relative importance to count as 6.

j.—All other reasons to be enumerated, such as healthy public sentiment toward corporations, etc. Friendly attitude of newspapers, etc. Length of time during which the gas business has been vigorously pushed. Relative importance to count as 6.

Summarizing, we have—

a	17.5	e	9.0	i	6.0
b	17.0	f	9.0	j	6.0
c	12.0	g	6.0		
d	11.5	h	6.0		100.0

I recommend a study of the relative importance of these items as affecting the sales per consumer and the earnings of the company. I think this work can well be made "of advantage to the Association," and to the industry. I have had occasion to make an analysis of the effect of item C—price of gas—upon the increase in sales per consumer and the increase in earnings of the company, and the analysis of all the items affords an excellent opportunity for "team work" possible through united organization.

In the early years of the Association the president's address was devoted to an epitome of the progress of the industry in its various departments during the preceding year. This *resume* is no longer necessary, for the able editors of the Progress Department of the Ohio Gas Light Association and the Progress Department of *Progressive Age* perform this important service, and this much of the President's occupation is gone.

I wish to take this occasion to recommend the value of the index of current gas literature published in *Progressive Age*. This index has supplemented the former meager index on gas literature published in the *Engineering Magazine*, and the men engaged in the gas industry are indebted to the publishers of the index first mentioned. We are prone to take too much for granted in this busy world, and I fear we do not fully realize the obligations the men of the gas industry owe the editors and publishers of the gas industry journals. Let us give the fullest measure of real support by encouragement, substantial as well as sentimental, to those who make the story of our doings possible. A comparison of the support given the trade journals generally in this country and abroad with the support given the gas industry journals will not give us much cause for congratulation. We can do better by those who do for us, and to do now is better than to-morrow. Our neighbors in the electrical industry show their faith by works, and we can emulate their example without a charge of imitation. I wish also to commend the publication of bulletins of gas machinery by those manufacturers who have engaged in this important campaign of education. We need this special information to keep up with the state of the art. Other industries find it profitable, and I hope for a continuance and development of this field of work.

I imagine the thought which is uppermost in your minds is the one of association work. Before referring to this, however, let me for a moment tell you of the growth of specialization in the gas industry. This year has seen the birth of the National Commercial Association, whose sponsors claim that they are opening a new field by showing their desire to improve and develop the commercial or gas sales side of the gas industry, and that they are following the trend of the time, namely specializing.

Then there is the Illuminating Engineering Society organized this year, whose object is the advancement and dissemination of theoretical and practical knowledge of the science and art of illumination. This Society is not strictly a specializing of the gas industry, for other forms of illuminants than those due to gas are considered, but the Society has among its members a number of gas men.

Then there is the recently organized Natural Gas Association of America, whose President is Mr. K. M. Mitchell, your First Vice-President. I understand the object of this new association is to further natural gas interests in general, but natural gas is different only in composition from the manufactured gas we produce, and is really a specializing of the gas industry. The growth of the societies and associations would indicate the necessity for sectional membership in the proposed American Gas Institute, for example, Section A—Managers, Section B—Engineers and Superintendents, Section C—Chemists, Section D—Commercial Men, Section E—Accountants, Section F—Natural Gas, Section G—Illuminating Engineers, and so on for each allied branch of the gas industry. Each section would have its own Chairman, or presiding officer, and its own Secretary. The Chairman would be a Vice-President of the American Gas Institute, and thus each section would closely affiliate with the Institute. The meetings of the sections would naturally have to be held at different dates, for the various officers and employees could not all be absent at the same time without detriment to the interests they represent. But they could all join for the common weal, and if occasion required, could present a united front for the protection and welfare of the gas industry.

It will be the function of the Gas Institute to facilitate co-operation between the various State and district associations, as they now exist, or as they may hereafter be formed. The Gas Institute will have individual and personal membership; the State associations united for the protection and betterment of State and local conditions may preferably have company membership, and thus more fully protect and conserve vested interests in the locality in which they are established. The Gas Institue may have local company chapters or branches to promote and advance scientific and practical knowledge in the gas business, and provide for the education of employees of gas companies to enable them to better perform their duties.

I believe that the Gas Institute should at the beginning of its career give careful consideration to the methods of conducting the Institute's work. The consideration to cover both the machinery of its business routine, and to recognize the personal element of its members, and to demonstrate the value and usefulness of the Institute as an organization to its component members. Good association work means good men, good investigators, and a better standing for the industry. The time spent in preparation for association work for the good of the industry is good exercise.

I believe that now is the accepted time to bring about a united front for the gas industry. The American Gas Institute is a possibility, it is more, it is almost a reality. The American Gas Light Association at its latest convention in Milwaukee voted unanimously for the proposed merger of gas associations. The Ohio Gas Light Association at its latest meeting in Cincinnati also voted unanimously for the proposed merger of the Association. At the meeting in Milwaukee of the Committee of the Gas Associations appointed to draw up a plan providing for a single gas association to be composed of the men engaged in the gas industry in North America, a resolution was unanimously adopted recommending "that each governing body instruct its organization that it is to proceed to effect the organization of the proposed American Gas Institute and the winding up and dissolution of the existing organization if such action be taken by any two or all of the associations named," viz.: The American Gas Light Associetion, the Western Gas Association and the Ohio Gas Light Association. By reason of the action of the American and Ohio Associations I make the statement above that the American Gas Institute is almost a reality.

The Chairman of the Committee of the Gas Associations, your past President, Mr. F. H. Shelton, has presented the recommendations of the committee and the proposed Constitution of the American Gas Institute to your Board of Directors, and recommended that your Directors, with your approval, "appoint an organization committee with full powers to take part in the organization, in accordance with the

recommendations named above, of an association to be known as the American Gas Institute, and to this end to wind up the affairs of, and to dissolve the organization they represent."

The record of the proceedings of the Board of Directors has been submitted to the Association, in accordance with the Constitution and By-Laws during the first day of this meeting.

The annual meetings of our Association are always occasions of special moment and general interest to our industry. That hundreds of our members from all sections of the country assemble annually for the advancement of our industry and the elevation of our profession is a splendid testimonial to the earnestness of achievement and aspiration. The spirit which pervades such an assemblage is the desire for improvement, for the increase of scientific, technical and commercial resources. Closely related to these high purposes is that social instinct of our industry, which would elevate and be elevated by interchange of views resulting from common experiences, and by mingling together in pleasant friendly intercourse. Happy is the association which meets under these ideals. The interchange of data, and results of observation and experience demonstrate the need of an association such as ours, and we have cause for congratulation that we have not been found wanting in our trial.

Death has laid but a light hand this year on our ranks. We are called upon to mourn for the death of but two members, Mr. A. H. Branch, of Denver, and Mr. John H. Tuffs, of Syracuse. A suitable memorial for Mr. Branch has been prepared by Mr. Frank W. Frueauff, of Denver, who was for a number of years an associate of Mr. Branch. Likewise Mr. William McDonald has prepared a suitable memorial for Mr. Tuffs. These memorials will be duly incorporated in our proceedings, as a testimonial to our respect and esteem for our departed members.

The new era is approaching. The responsiblities of association work no longer are ours as the Western Gas Association. We give up our life as an Association for the good of the industry. No man can make a greater sacrifice than this, that he give up his life for his friend. The possibilities of the work before the new American Gas Institute are almost beyond presentation. In acting as the representative of many thousands of gas men in North America, the new Institute is assuming great responsibilities which will increase from year to year. It will require administrative and executive ability of the highest order to meet these demands; but there is both prophecy and proof in the work already accomplished by the individual associations now to be merged, that men will appear as needed to discharge the duties of a great industry for the good of all interested in the welfare of the industry and its patrons. And in the march of progress, I cherish the thought and hope that those who have so bravely and loyally upheld the banner of the Western in the years that have gone, will enlist under the new flag of the American Gas Institute with the same loyalty and fortitude that has brought undying glory and fame to the Western Gas Association.

APPOINTMENT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Vice-President Mitchell—Gentlemen of the Western Gas Association, we have listened to this very interesting address of our President. Assuming that in the usual course it will go to a committee for consideration and report, if there is no objection I will appoint as such committee Messrs. E. G. Pratt, W. E. Steinwedell and F. R. Persons.

The President—I hope the gentlemen will not leave the room, because now will begin the regular programme of papers. The first paper will be by Mrs. Guldlin, of Fort Wayne, and we want to have a large attendance as a courtesy to her. Before that, however, Mr. Steinwedell of the local Committee of Arrangements desires to make an announcement.

Mr. Steinwedell—I would like to state that there will be a flash-light photograph taken in this room immediately after the morning session, and everybody that can ought to be here.

The President—I have the honor of presenting to you Mrs. O. N. Guldlin, of Fort Wayne, Ind., who will read to you a paper upon

THE RELATION OF GAS TO OUR MODERN LIFE.

I am sure we are all honored and complimented by having Mrs. Guldlin with us this morning. I bespeak your kindly attention. (Applause.)

It is a privilege this afternoon to be with you, especially to take a small part in the work of the convention.

For years I have been a very happy partaker in the festive side of these meetings. If I reckon time by the great changes that have taken place in the gas fraternity since I started in to attend its conventions, I should believe myself very old.

Many have come into the ranks, and many old faces are missing. Many changes have been wrought both in the manufacture and distribution of gas.

Large corporations have been formed. The latent talent in your ranks has had a chance to manifest itself, and many who were little known have achieved positions of prominence.

My joy in life is to be linked with a fraternity where age does not count, and where all go on to the end with unabated vigor that shows no mark of time. Our Uncle Jerrys tell us that the vigor of youth is perrennial in the gas fraternity. I rejoice that your President has extended to me this privilege of taking part in your meetings; not that I can add to your knowledge, but that I can at least thank you for what you have done for womankind.

Your business, perhaps, more than most others, has a direct relation to the home. Its security, growth and strength is largely dependent upon the domestic life, and the use of gas largely registers the development and demands of a better domestic and municipal life.

We housekeepers are the principal recipients of the bounties that you spread before us, and you are one of the regenerating factors in the life of the home.

In the great world of thought we recognize the tremendous changes that have taken place in every line. It is easy to contemplate what the railroads, telephones, electricity and other inventions of this age have done. It is easy to see the spread of education and the change in religious thought, but when we come to domestic life we are so wedded to the old ideals and standards that the conservative element in us will not admit that these standards are entirely changed, and that the next 25 years will re-make home conditions and its problems.

We cannot say where these standards come from, but I like to think they grow out of the eternal evolution in the development of man. I like to believe that we are living in the world of thought, and that the unfolding of all these miracles and mysteries is simply the answer to the change in the demands of men. It seems to me that the old, circumscribed world of conventionality and form is largely passing away, and that a new civilization, bright in the luster of science, wisdom and justice, is knocking for admission.

We are so blinded by the world of mammon that we do not recognize this poetic and beautiful stranger, but the import and meaning of all this remarkable growth and development are only the outward symbols of the inner growth in the consciousness of race development.

What produces it?

Centuries of unfilled longing in the breasts of splendid men and women, the desire for education, opportunities for a peaceful, happy life. We could not have framed it, or put it into words, but it is the unspeakable recoil of good men and women from sin; the mounting higher on the ladder of education and opportunities to get a new faith and better ideals that grow out of a broader horizon.

This continual seeking after sense and a wisdom that will not be dulled by the dross of the world; this groping for the real; this expanding intelligence and these enlightened cravings, have their effect. This new world is the outcome of centuries of unrest and yearning. Some call it progress, others call it God. We ascribe these changes to man's ingenuity, yet all these forces have lain dormant for centuries. Men are only now discerning the principles of electricity. The principles were eternal, but they can be known only by the growing needs and demands of mankind. The wisdom of man is simply reducing things that have been in eternal science and chaos, to man's understanding. Simplicity is the key note of our present day living; that simplicity that grows out of knowing the intelligent, easy and most direct way of doing things. This simplicity and science of living grow out of the stress of demands in our modern civilization.

Gas, in its practical application, is one of the most potent factors in meeting the present demands. The sewing machine meant much, but before they had it people wore simple clothes, so that the sewing at best only consumed a small part of the time; but cooking is the ever present work of women. Ninety-five per cent. of the cooking is done by women. In the old days gas was not a necessity. With an abundance of good hickory wood, abundance of time, abundance of good, inexpensive help, it was a very different proposition. But now the whole occupation of women is largely changed.

Formerly, all the work of living, from raising the raw material to converting it into the finished product, was done in the home. With the introduction of modern machinery the life of the home was largely taken from it.

Fifty years ago seven occupations were open to women. Now there are scarcely seven that are not open to them. Over 5,000,000 are wage earners in the United States. The number is rapidly increasing. Th

cost of living at that time was a mere trifle compared with what it is now. The labor was transferred from the home to the factories, and the women, to meet the increased demand in the cost of living, must live in other fields. This leaves the bulk of the domestic labor to be carried on by a small proportion of the women. Other lines offer greater inducements in the way of social position, systematic work, promotion, regular hours, with evenings and Sundays at home; consequently the most incompetent class is left to the household. This scarcity of girls forces the wages up. As much of the help is unskilled, the waste is excessive. Between the high wages and the waste the cost of keeping a servant is so excessive that for the masses the domestic labor must fall on the wife.

While statistics show that the average income is much smaller than we imagine, the average demands of the family entail far more expense than formerly. Education, in becoming universal, is creating universal standards of living. When we unify the needs of men, we are creating tastes for all the good things of life. It is consequently necessary for the wife, in order to meet these additional requirements, to adopt all the mechanical devices that will simplify labor.

The woman, to be thoroughly competent, must be an artist in many directions, because she stands behind the life of the home, the life that is to go out and mould the destiny of nations.

The children must be educated and well dressed. They must have the same moral training as of old, but, in addition, they must have a breadth and culture that the earlier periods did not require. The woman, to be thoroughly competent, must live in the world of ideas as well as of work. To accomplish this and discharge her mission, there must be time for rest, growth, society, study; time for the soul to claim its own.

And another thing that we can hardly omit: The modern man is not the same old man. Outdoor work made the rest and quiet of the home desirable. The father and mother were largely absorbed in the same occupations. Their lives and that of their children ran along together. The tendency now is to absorb his time and attention in offices, so that when the work is done he wants recreation and amusement. Many of them seem restless under the restraints of home, so that now the women have not only to raise heroic children, but the duties of wife have taken an increased demand.

Women have ever set their pace to keep step with men; but if we observe the tendency of most men, they are men of the world. We hear much about retaining the domestic type of women, but so far as I have been able to observe, the man whose wife's mind is bounded entirely by the domestic horizon is often looking for the club, the actress or some more complex and diverting form of entertainment. Some of the clubs, the saloons, the licentiousness of the nation, grow out of the distorted sense of what constitutes the joy of living.

Now, so far as I can observe, men are not very domestic, and the domestic part of the family must be studied and met by the wife.

To meet all the present day requirements she must have health, style, knowledge, love, wisdom, great ingenuity. She must have beauty, wit, a daily and hourly charm to satisfy all the fastidious tastes of the modern man. These qualities are incompatible with being a family drudge. If the home meets the demands that are right now required of it, it will be, as it always has been, the balance wheel of the nation. It will keep it pure, give it brawn and marrow, but it can not do so unless the home falls in line with all the modern, progressive ideas.

Women must lay aside the old-fashioned way of doing things and put the same science into the home that men are putting into their business, and personally I believe that many women are only waiting to learn what these best things are.

Some months ago an expert demonstrator came to Fort Wayne. She had a modern kitchen, with modern appliances and utensils. I think she was the first in Fort Wayne to use the overhead oven. The gas company kindly sent for it, as she would not use any other kind. She told me that she could not think of guaranteeing her results with a coal or wood stove. By selling these utensils the lady made some profit. It was perfectly amazing to see how the orders came in, and how many ladies were eagerly watching for the best methods of cooking. Many gas stoves were sold as a result of her work. In Fort Wayne we are between the natural and artificial gas periods. We do not need to be told the advantages of gas. Everyone knows the conveniences and comforts, and we also know that we cannot guarantee the same results with the old-style stove. I believe women are all anxious for these quick, easy processes, and it seems to me there is no other agency that has met this great demand in the home so fully as the gas companies. You have been an educator in the domestic world, but it is very hard to learn about the latest and best things for the home. Where can we look for the latest kitchens and laundries really in operation? Recently I was talking with a wealthy Cincinnati woman who was trying to build a model home. She told me she had to travel and look a great deal in New York and Chicago to find the latest and best equipment for kitchen and laundry purposes, and in most of our cities we do not even know of these best things.

At the World's Fair every phrase of the gas industry was represented and advertised except the practical part of seeing these best things in operation. There were thousands of women suffering from the domestic troubles that grow out of insufficient help, troubles that are national in their character, and yet this domestic phase of the exhibit that would have filled them with ideas was not adequately represented.

At the time of the Philadelphia Exposition, in 1876, many ladies were painting rolling pins and shovels. This was about as far as the artistic feeling in general had gone. In our public schools our highest art was to copy a few paintings or designs.

Now, the real *idea* of art, that means the training of eye and hand, to see and express correctly; that develops originality, artistic feeling, and a conception of the beauty and utility, is being taught everywhere. Our expositions have largely the art world in the United States, and this changed condition is beginning to express itself in the municipal and domestic life. Art is the beautiful conception of life, but just now we are crying for this expression of the practical that will help solve these problems. The nation is rich in its glorious achievements. The forerunners of science show us that health, happiness and a better social and moral condition is within our reach, but it cannot be obtained unless the knowledge of wholesome, simple, easy living is universal.

In Chicago we can see in Marshal Field's, Toby's and other stores the more artistically furnished rooms, but I have yet to see the utilitarian side well worked out. I rejoice to read in your Journal that the Berlin Gas Company is combining with other business firms in furnishing rooms, so that the ladies have the opportunity of seeing the latest and best decorations, as well as the best heating and lighting appliances.

I recently talked with a friend who had just returned from Paris, and she tells me that in the same rooms where the Salon is held, after it is finished they have these rooms furnished artistically and usefully for the women to inspect. She says that one can go through one room after another. All the firms have united to make this emporium a great success, and it is doing a great deal for the women of Paris to teach them all the latest and best things in the way of household econmies.

I also see with great pleasure what Baltimore is doing, in having two finely furnished rooms with all these modern conveniences in working operation for the ladies to see. Many other gas companies do at times afford these opportunities, and it seems to me as if you had left little or nothing undone. The club women all over the country are beginning to take up practical subjects, and I am sure they will gladly combine with you to introduce all that is best to the people.

In Fort Wayne we have had days at the meetings of the Women's Club League, when the ladies exhibited all the newest things in the domestic science line that we were able to obtain. At the coming meeting of the General Federation of Women's Club's in St. Paul, the Home Economics Department hopes to have furnished rooms to demonstrate much in the way of a convenient, simple and artistic home.

We have our State convention of the Indiana Union Literary Clubs at Winona next fall. At our executive meeting of the officers at Indianapolis the other day it was decided to do what we could to show at this convention all the practical phases of the home economic work. We hope to have a display of pure foods, and a small collection of books in this line, and we would be very glad to have the best kitchen utensils that can be obtained to reduce the work of the home.

If I could have the co-operation of the manufacturers, I would be more than glad. The club women want to do all these good things, but there is very little club money to carry them out.

In Indiana the Home Economics Department is expecting to issue a bulletin carrying all this practical knowledge to the club women over the State. If you could co-operate with us in lending us literature, ideas and utensils, we would be greatly indebted to you, and I am sure our knowledge of what you are doing would be greatly increased.

It seems to me that this desire to adjust housekeeping to a more universal standard is a subject of growing importance. We are all working in the same line, why not join hands and make it easy? Domestic science is gradually becoming a part of the curriculum of the best co-educational and women's colleges.

It is rapidly entering the public schools, and even at the county institutes it is a much agitated question, and is creeping into the consoli-

dated country schools, to say nothing of Pratts, Oriad and the many excellent institutions that are making a specialty of the work.

I think the work of the gas companies has done much to intensify this great desire of domestic knowledge that is passing over the United States. This great interest is not confined to America. Europe is doing much to aid in the solution. Women are everywhere awakening to the fact that the scientific management of the home is the surest solution of their troubles, and perhaps the best and only way to establish health, happiness and a better moral condition. This can only be done by utilizing all the available means that you are bringing to us.

But there are three things I still want to mention. Gas fuel is now so all-important that we are prone to forget what gas light means to the housekeeper. In the first place its cheapness recommends it; then, the light is a more agreeable one, and for private homes the soft, low light is far more delightful. Many do not like the glare of the electric light. It seems to me that if we could see beautiful gas lamps everywhere in display as we do the electric light designs, many housekeepers would much prefer them.

I understand that these lights are on display in other cities much more than we have them in Fort Wayne; but in my travels it seems to me the electric light people have gotten way ahead of the gas people in their displays. I have been very anxious to see them, and we see them in gas conventions, but we don't see them in every jewelry and every drygoods store, as we do the electric lamps, and yet one light will take the place of several of the electric lights, and that means a lot to us housekeepers, who have so many ways of using money.

The laundry is a great bugbear in most homes. The public laundries are too destructive on the clothes and too expensive for general purposes. I imagine that the municipal laundry that is utilized in England will, in time, be installed here; but at present it is usually done at home. Washwomen are hard to procure, and girls object to washing and ironing. If we could utilize gas mangles it would be a great help, for there is not time for so much hand work.

While we are all interested in making the gas industry a commercial success, we are still more interested in seeing it universally adopted, for we know what it will mean to the good women all over the country. Therefore I hope you will give us gas at the lowest price compatible with having a good quality.

I tried to show you how we need your aid, and we appreciate what you are doing for us.

Just remember, in proportion as you can lift this detail drudgery from the life of women, you are raising a higher standard of wives and mothers. She cannot be all you want her to be if she is not helped in her life work, and all you add to her life she will give back to you in richness and joy to your lives and to that of the nation.

The President—I am glad you show by your applause how much you appreciate Mrs. Guldlin's efforts in trying to show you how we need your aid, if I may quote your expression, and appreciate what you are doing for us. Tne paper is now open for discussion.

(To be Continued.)

[Official Report—Continued from Page 932.]

TWENTY-SECOND ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

Held in Cincinnati, O., March 21, 22 and 23, 1906.

Second Day—Morning Session.

The President—The next order of business is a paper on the subject,

SOME ECONOMIC RELATIONS BETWEEN PUBLIC LIGHTING CORPORATIONS AND THE PUBLIC,

by W. H. Gardiner, Jr., Boston, Mass.

W. H. Gardiner, Jr.—Mr. President and Gentlemen, before starting to read my paper, I would like to remind you first of my definition of the total cost in the gas business, and secondly, I would like to call attention to the various movements now taking place throughout the country indicating great strength and looking to govermental ownership and govermental regulation. It was in connection with these matters that this paper has been written.

There apparently is an increasing tendency on the part of the public to deprive the public service corporation, by legislative action or otherwise, of any profit or net earnings over current expenses and current charges on invested money. In this, whether done by city, State or federal action, the main object seems to be to forthwith save to the community whatever moneys a public service corporation may be making as current profit—nor does any cognizance seem to be taken by the public of the many coincident ways in which the public is affected by the elimination of profit from the public service business.

To show that to eliminate profits from the public lighting business is against the public interest is the purpose of this paper. To do this certain of the economic forces which cause and which control the public lighting business must first be reviewed under the following major headings or groups, bearing always in mind the fact that the public is the most important part of the public lighting business.

1. Economic forces causing the inauguration and conduct of the public lighting business.
2. Non-monopolistic character of the public lighting business.
3. Economic laws governing prices.
4. Main items of specific interest to the public in the public lighting business.
5. Adjustment of "price" on the basis of saving and profit sharing.

In considering the public lighting business under these headings, the attempt will be made to show:

(a.) That the present specific "price" or gross cost of a given public utility is really subordinate to other features of the service, which, taken together, are of more importance to the public than is the present "price."

(b.) That the best interests of the public in total can be served to the fullest extent only when the public lighting business is conducted upon such terms as to yield to the corporation an incentive or profit over bare operating expenses and current interest charges which together constitute the real current costs.

Before proceeding with the discussions under these headings it may be well to differentiate as between a public service business and various communal or governmental forms of enterprise and activity frequently confounded therewith.

A community, be it a village or nation, in conjunction with its purely governmental functions, conducts many enterprises simply and entirely for the public good, placing the burden of these through taxation, not in proportion to use by the individual or worth to the individual, but, at least in America, almost entirely on those individual shoulders which can most easily bear this burden for the good of the whole public. It gives the individual facilities and renders him services, not because he personally contributes to meet the costs thereof, but simply because he is a member of the community. These services are thus impersonally extended, because public safety, public health and the general welfare are thus enhanced. Such undertakings as roads, parks, schools, hospitals and sewers are for the general good, free to all, because, if their use were restricted, as it would be by an individual charge, the public as a whole would suffer.

Likewise police protection of the individual and his property, fire service, street lighting and the health department must be administered impersonally for the public good. The same might be said in favor of the free distribution of water for all except industrial uses, because it is an absolute necessity to life and health, its scant use is deleterious to the public health, and it is practically unobtainable in quantity in large cities except from the public supply. For these and many other reasons its supply is governed by considerations entirely foreign to other forms of public service.

These other forms of public service, as lighting, traction, means of communication, means of exchanging commodities, etc., hold a different relation to the community wherever, no matter how generally used, they are not prime necessities, even though so considered in our highly developed community. Their use is individually optional and selective from among other means to the same ends. Their use by the individual is of less importance and profit to the community than to the individual and therefore the individual, instead of the community, pays directly for his use of the service in spite of the resultant restriction of use. For a community to enlarge its activities in this field is for it to go from a communal to a socialistic form of government; to engage in not only unreproductive public services solely for the public good, but to court public loss in reproductive public enterprises for the profit of the individual customer. Such business activities are outside the legitimate realms of government, unless the latter aims at socialism. That the public service corporation conducts them is because the public is best served in them through the public service corporation. This brings us to the inception of the public service business.

The Economic Forces Causing the Inauguration and Conduct of the Public Lighting Business.—An industrial economic advance, as distinguished from a governmental economic advance, is invariably effected because of personal initiative and usually for motives of private gain. A study of the rise and comparative rate of industrial development of different nations would indeed lead to the inference that their

rates of development that have been coincident with and dependent on the degrees of personal liberty and individual initiative and incentive existing in each. To this, more perhaps than any other one factor, does America owe her hitherto unprecedented rise. To setting aside their social and governmental restrictions of the past and thus allowing action of the individual initiative, fostered by wise governmental subsidies, do Japan and Germany owe their recent industrial expansion. But underlying and causing most individual initiative, is the object of personal gain. Furthermore, it is generally true that the greater the opportunity of private gain, the more rapid and thorough is the industrial development, be it the invention and exploitation of a patent hairpin or the inauguration of a trans-continental railroad. Because of this, it is true, that the greater the opportunity for the promoter of a public service the more quickly and more fully will the public be served to its advantage, up to that point at which the private gain of the promoter absorbs all the gain possible over other means—as municipal ownership—at the command of the public.

An industrial advance is made or a public service is developed usually in one or two ways. The first is that a scientist or inventor hits upon some new or undeveloped physical means to an industrial end. This might be defined as the physical means or "supply" available to a potential industrial "demand." Realizing the possible utility of the new means to improve the industrial situation, markets or a "demand" for the special means in hand are sought and developed necessarily to the betterment of the community. For otherwise the business will not survive. Now the betterment of the economic status of the community thus accomplished is due solely to the individual initiative of the inventor and his backers, undertaken almost invariably for purposes of personal gain incident to the service they have within their power to render the community, which service the community cannot demand of them, nor, unaided by them, can it procure it for itself, and whose fruits it should not take in full from them as it frequently seeks to do.

The second method by which an industrial advance is made is by some individual or industrial group of individuals apprehending an industrial want or "demand" on the part of the community, and, with specific intent and purpose, seeking out physical or business means, or a "supply," to fill said apprehended "demand," again to the betterment of the industrial status of the community. Here again we have an industrial betterment accomplished for objects of private gain and solely because of individual efforts and initiative. Nor can any noteworthy instances of industrial betterment be cited where individual initiative for private gain was not the spur of accomplishment, save, perhaps, only certain co-operative movements which have really for object only the private gain of all the co-operators regardless of their effect upon non-co-operators.

That the first of these two paths of development by individual initiation solely for private gain resulting in public good was that followed in the inauguration and development of the gas business is patent from its history.

In the 17th century, gas distilled from coal was known. At the close of the 18th century it had been used as an illuminant in isolated instances. Here we have the physical means to an industrial end at hand. At the outset of the 19th century, markets for its use were sought and developed, to the immediate betterment of the conditions of life in the dingy city of London. The community, as it with great difficulty became educated to the use of the new illuminant, found that it was thereby much better served than by pine knots, rush and tallow candles and sperm oil lamps. But to-day it gives scant thought to this economic gain conferred upon it by the pioneers of the gas business and their industrial successors. On the contrary, it frequently seeks to wring the service from them at bare costs, simply because it may be with the power of the community so to do, as investments are already made in the business and as it is of necessity and for the public good must permanently use the public streets and operate, therefore, under public franchises.

In the electric lighting business, the path of economic development was somewhat different. To be sure, the galvanic arc long preceded the electric light; but since 1876 almost all the apparatus and methods of the electric lighting bnsiness have been specifically developed with the intent of meeting definite industrial opportunities at first pointed out by the gas business. It was not, in fact, until electricity had absorbed the major part of such business as it could readily take over from gas that it began to seek undeveloped and to a notable extent essentially new markets, to develop the newer ways in which the public could, advantageously to itself, use electricity, which now comprise probably the larger part of the sales of a modern central station. Both in the first stage and this latter stage of the development of electric lighting, the community has been greatly benefited. But to obtain this benefit from electricity and from gas the public beneficiaries have contributed absolutely nothing but the opportunity for the gas or electric light man to serve them through the use of their streets. On the contrary, because they to some extent hold him in their power, because of the necessary use of their streets, they exhibit an ever increasing tendency to wring from him and appropriate to themselves all increments over bare costs. In this they act on purely selfish motives of immediate gain, overlooking not only justice to their servitors and benefactors but also their own best interests.

That this is so it need but be pointed out that but for the incentive of private gain over and above operating expenses and interest charges on invested capital, there probably would never have been any gas or electric lighting business, as brains and capital would have found more remunerative return in other undertakings. To now, by legislative means, put the gas and electric lighting business on this penurious basis is, on the part of the public, a "penny wise and pound foolish" policy. This is patent to every manager who is foresighted enough to know that, however great may have been the economic benefits in the past bestowed on the community by the public lighting business, they are but the lesser part of those still in its power to bestow. But these future benefits will not materialize unless the business is left unhampered by the interference of laymen and with sufficient premiums, as incentives, to warrant the fullest expenditure of individual initiative and investment for the purpose of developing the business in the further service of the public. That this can best be done only under the incentive of private gain is evident from the persistent failures of municipal lighting enterprises, at least in this country. A recent and pertinent example of this is Richmond, Va.

Springing, as above outlined, from the sources of individual initiative under the incentive of personal gain, the public lighting business has reached a broad and established basis. It has, generally speaking, left that earlier stage which might be considered as analagous to that of a patented invention, the inventor of which is entitled at first to a semi-monopolistic premium as implied by the patent. This premium our industrial forbears may have reaped in the past. To-day the business stands in the open competitive market, having given many times more in savings over other supplies to the community than it has ever returned in profits to its promoters and managers. In fact, if we do not consider superior facility, it has reached its present status solely because it has effected this saving for the community over the costs pertaining under other means to heat, light and power. To the degree and amount of this saving it owes its magnitude and general usefulness as an economic benefactor to the community. By this saving it has proven itself to be "for the public good."

Non-Monopolistic Character of the Public Lighting Business.—It is usually thought that the public lighting business is essentially monopolistic in its nature. This opinion is arrived at because the business is considered solely from its physical status, rather than from its economic status.

The so-called public lighting business consists of supplying the public with means for the generation on their individual premises of light, heat and power, the means to these ends being produced in or distributed from central stations, the distributing system making use of the public streets. Whether the agent or means to these ends be gas, electricity, steam or any other available agent, matters not. The service being sold is an essentially unlimited supply on the premises of light, heat or power and the commodities really bought are candle power hours, heat units and foot pounds per minute, whether sold in the form of 1,000 cubic feet of gas, 100 kilowatt hours or 50 pounds of dry steam at 100 pounds pressure.

A true industrial monopoly is a monopoly of a market or markets, and can exist only when all means or supplies to a given market or demand are controlled at one center. The Greek word "mono-poly" means "the-many-in-one." The exclusive control of one or more means, agencies or supplies to a market or markets is not a true monopoly unless the exclusive control includes every artificial means, agencies or supplies to the market or markets in question. Now the markets of the public lighting business are the demands of the public for artificial light, heat and power. The public lighting business has exclusive control of only the agencies gas and electricity, and of only such gas or electricity as may for that purpose be generated in central stations and distributed for more local use through the public streets. It, therefore, has a so-called monopoly of certain means or supplies to certain markets. But it does not in any way control other agencies or supplies to each and every one of the markets to which it sells. Since many other agencies or supplies are more or less available to these

same markets, the so-called public lighting business is, in every one of its markets, in more or less keen and always open competition with many independent industrial rivals, every one of whom use the public streets free of charge in the distribution of their commodities. Therefore, the public lighting business never has a true monopoly of any of the markets it supplies.

Furthermore, the fact that, let us say, gas is used exclusively in a given community as the sole agent of artificial light, heat and power, would not confer upon gas the economic monopoly of those markets in that community, for it would have ever present potential rivals for these markets whose constant presence would control and dictate the terms on which gas held or lost the so-called monopoly of its acquired markets with far nicer accuracy, with stronger power than could legislation.

The thought of the moment would decide that if, let us say, gas were used exclusively for lighting dwellings, then gas would have a monopoly of this particular lighting market and those of the public who there so use it would be in the hands of a monopoly for their supply of artificial light. This last is not true. While gas may anywhere or for any purpose be used exclusively, it nowhere nor for any purpose is without past or present active or potential rival means to the same ends—rival supplies to these same markets which gas may have exclusively pre-empted. That gas may now exclusively supply them means not that gas has a true monopoly of them but merely that gas may have displaced all other agencies in the artificial lighting of dwellings. The cause of this supposedly complete absorption of these markets is not, as some seem to think, that the gas company has the exclusive right to distribute gas through pipes in the streets, but is that those needing artificial light in their dwellings have supposedly found that gas is a better or cheaper source of artificial candle power hours than any of its many, many industrial rivals for this particular business. They, therefore, have all adopted gas to the supposed exclusion of every other artificial means of lighting their dwellings simply because the gas supplied their wants better for a given expenditure or supplied them at a lower cost—because it "paid" the customer to light with gas rather than with anything else. Therefore we erroneously say gas has "monopolized" this market. It has beaten all the many other competitors for it, and as it has done so because it showed a saving to the community it has, in pre-empting this market, bestowed a direct and ponderable benefit upon the community, in return for which the latter does nothing and usually shows no gratitude.

As an example of this, let us arbitrarily assume that light from candles cost $1 per 1,000 candle power hours and from oil 50 cents per 1,000 candle power hours, while gas may yield 1,000 candle power hours for 25 cents. Let us also assume arbitrarily, but incorrectly, that the amount of light called for remains a constant. Having supposedly used only candles, the community saves half its lighting bill upon using oil instead of candles, and when gas displaces oil the community again has its lighting bill cut in half under the present primitive system generally used in charging for gas. That the amount paid for light by a fixed community may remain constant and the service rendered increased four-fold is simply a transposition of terms. Here are two successive benefits bestowed on the community for which it gave nothing but the use of its streets to the oil man for his distribution teams, and then also to the gas company for its distribution mains. Incidentally it may well be questioned whether the oil man or the coal man does not depreciate public street property more by their free use of it and cause more public inconvenience and dirt by their innumerable teams than does the gas company by its mains installed under franchise, if the comparison is reduced to terms of "per candle power hour or heat unit obtained." It should be remembered that they all seek to perform the same economic functions in the community—to supply its demands for artificial light, heat and power. Their only real differences are in their several physical means or agencies to these ends. These different physical agencies necessitate different physical facilities for their action. Therefore, the public lighting corporation is obliged to install through the streets fixed conduits, under restrictive franchises, while its competitors may fill the streets with their transient teams free of charge or restraint.

The following deductions should result from a consideration of the essentially and thoroughly competitive character of the public lighting business and of the benefits it may confer upon the community by absorbing the business of the community as nearly as may be in whole:

1. The business carried on by individual initiative and for private gain has, by engendering keener competition, in which it has survived, given the public better service at less cost, thus conferring upon the public a benefit whose degree and magnitude are reflected in and are measurable by the present magnitude of the public lighting business.

2. The public lighting business is in no way a true industrial monopoly, because it controls but two of the many competitive sources or means of supplying the public demand for artificial light, heat and power.

3. Should it ever be the means of furnishing all the artificial light, heat and power used by a community, still it would not have a true monopoly of the business, as others could re-enter successful competition as soon as they could so better their industrial conditions as to effect sales of their agencies for light, heat or power in these ever open markets.

4. The degree in which public lighting service is used is not an index of its control or monopoly of a market, but is an index of the benefit it has effected for the public by establishing itself in that market.

With these conditions in mind, let us turn to a more specific consideration of

The Economic Laws Governing Prices.—While the price mark for a service or commodity may be written by the seller, the price in the open market is made by the buyer. In the open market things are sold on the basis of what they are worth to the buyer and not on the basis of what they cost the seller. Between minimum cost to the seller and maximum worth to the buyer, prices range in the open market under the dictation of the many complex laws of political economy—laws too elaborate and intricate for discussion here. The buyer cares nothing for cost or profit over cost. His aim is to buy what he wants at the minimum expense to himself. The seller, on the other hand, aims first to receive more than bare cost and then as much more as he can get out of the buyer. Competition, supply, demand, living wage or price, non-restriction of trade, cultivation of buying power, and many other determinants fix or arbitrate the price between the points separately desired by buyer and seller. The resultant of these many determinants is that prices range in fairly close parallelism to costs, the margin to profit or loss being largely determined by the individual ability or power of seller or buyer. Such at least are the conditions under which open competitive trade is conducted, when the buyer takes no thought to so treating the seller that the latter may, as quickly as possible, be put in a position to, let us say, manufacture at much lower costs and, therefore, sell profitably at prices below present costs and when the seller cares nothing for stimulating the purchasing power of the buyer or securing their own future position by lowering prices and profits per unit sold to an expanded market.

But where the ability to reduce costs to the seller and the ability to make increased purchases by the buyer are as mutually interesting to the buyer and seller alike as they are in the public lighting business the individual best interests of each and both dictate a different policy on the part of each for the good of each—public and corporation alike.

The public as the buyer is immediately interested only in obtaining the maximum service of the quality best adapted to its wants, at the minimum expense. The specific interest of the corporation as the seller is in obtaining the maximum net earnings compatible with security to its investment. The problem is to co-ordinate these apparently antipodal interests in such a manner that they will each, from selfish motives, work out the best interest of the other on a basis fair to both.

Suppose a mechanic, expert in every trade (as is capital) were called upon to make shoes for a man we will call the customer. The shoes are worth any price over $5 a pair to the customer, but he can get them elsewhere for $5 a pair. The operating expenses and fixed charges of the mechanic, making his total costs, are $4 per pair. If the mechanic cannot make shoes for others to whom they are worth over $5 and who cannot get them for $5, he will make shoes for the customer at, say, a shade less than $5, he will make thereby nearly $1 net per pair of shoes.

This is analogus to a public lighting corporation which cannot sell outside its territory, and therefore must sell in its territory on the best terms which will get the business.

Now, suppose the customer attaches all the assets or tools of the mechanic, and then says to him: "You are fixed here now; I control your tools; you must use my premises. Unless you make my shoes for bare cost (expenses and interest on your plant), that is for $4 a pair, I will put you out of business." The mechanic must choose between two evils: he must swallow the loss of at least a part of the value of his plant and get out and into some other business, where he may remain free from control to make a profit, or—reduced to penury—he must face a treadmill of making shoes at cost without incentive to improving his work, because he will not personally profit by any improvement, the opportunity to make improvements, resting, however, entirely with him and not with his customers.

If he gets out of the shoe business, the customer must get his shoes

elsewhere or make them himself. In public lighting terms, if by legislating down the earnings to bare cost (which is operating expenses and interest on the investment at the normal rate money can earn in the open money market) the public drives capital and brains out of the business, the public must resort to candles and oil or resort to municipal ownership, which is just about as efficient, as insisting on making your own shoes instead of buying them from a factory, just because the factory makes a profit out of selling you better shoes than you can make for yourself, at less than half what it would really cost you to make them for yourself.

But suppose that the mechanic does not get out of the shoe business, but settles peacefully down to make shoes for the bare costs consisting of operating expenses and 5 or 6 per cent. charges for interest and depreciation on invested capital and equipment. He just keeps on making shoes for $4 a pair. He doesn't try to lower costs, because there is no incentive of personal gain. He doesn't try to improve the quality, because improvement brings nothing but a cry for more. He doesn't try to do more business, because the customer takes all the profit from all business in the form of lower prices. The only thing that makes him move, is when the customer tells him that if he doesn't cut his price, shoes will be bought elsewhere or will be home-made. The net results of this, are unsatisfactory to mechanic and customer alike, because shoes remain at about $4 and the business shows no current net profit.

Now let us assume that the customer, instead of by legal means reducing the mechanic to industrial slavery, for the purpose of immediately getting his shoes for $4, had said: "The shoes you make must yield you their bare cost, $4; they might yield you anything they would bring over cost, that is, anything they were worth in the open market. But I am now your only market and I can get the equivalent of your shoes for $5. As I own the premises on which you must work (the streets) and as your plant is there established, I could force you to make my shoes for $4. But I will not, because I believe that, if it is worth your while to try, you can eventually make shoes for much less than $4. Now, I can't get the equivalent of your shoes for less than $5, but from now on I will let you take in profit over whatever your costs may be, an amount equal per pair of shoes to the difference between $5 and whatever you charge me for shoes, but you cannot take out as a profit any more than an amount equal to that you save me by charging me less than $5." In other words, the customer offered to split the difference between cost and worth, taking his half in savings under an equivalent service and allowing the balance to the mechanic as an incentive to development, the customer expecting from this development (which lies entirely with the mechanic) shoes cheaper than $4 and the mechanic expecting coincident profits greater than 50 cents per pair of shoes. To come to the end, let us say that, under the stimulus of this personal gain, the mechanic hires brains and capital and transforms his shoemaker's bench into a shoe factory. (That this is no greater change than can be wrought in gas is witnessed by at least one well established company, which under rational sales and rates systems, added about 50 per cent. to its sales in the last year in the face of an increase in population of less than 5 per cent.)

Now let us say that the shoes from the new factory sell for $3. The customer gets his shoes $1 cheaper than he would have, had he ground the mechanic down to the original cost of $4 and forever refused him any profits. The mechanic makes a net profit of anything he can between $3 and his cost, whatever that may be, only, however, up to $2. Also as shoes of standard quality are cheaper, the customer buys more pairs and is, therefore, better served, while the mechanic makes more money.

Now, in this profit sharing, or saving sharing, what are the motives? The customer wanted all the shoes he needed of standard quality and at the minimum price. The mechanic wanted maximum net earnings, compatible with the security of his business. By each yielding half to the other, the customer got his shoes for $3 instead of $4 and the mechanic still made a better profit than at first.

Similar results would ensue if the initial or standard price from which the profit sharing started had been $4 (the bare cost to the mechanic) instead of $5 (the industrial worth to the customer). However, as the margin of true profit or incentive to the mechanic is thereby minimized, it may well be that he will not be as strenuous and daring in developing the business, and lowering the price of shoes, as he would be if the standard price were the higher price, and the possible profit therefore greater. Starting with the cost price as the standard price may show the customer, lower prices certainly at the start and possibly after development. But that this is conclusive evidence that it is to his advantage so to start the profit sharing, does not necessarily follow. This is because the customer is really interested in and may be benefited by many other considerations, perhaps to a greater extent than he really is, by the sole consideration of the net average price per unit of service or commodity. To the development and betterment of these other considerations, the prime requisite is initiative on the part of the corporation rather than mere economy of management. But under persistant human limitations, the prime requisite for personal or corporate initiative is personal or corporate gain or profit which invariably stimulates the activity of endeavor in public or private service in proportion directly to the degree of private gain to the servant therein.

Items of Specific Interest to the Public.—To understand that the development of other factors of the public lighting equation is perhaps even more important as a source of benefit to the community than solely the reduction in price, it is necessary to review in some detail the main and essential interests of the public in the public lighting business. Without attempting to list these items of vital importance to the public in any way in the order of their comparative importance each to the others or to the public, they may be defined as follows:

1. That the service endanger life and property as little as is physically and economically possible.

2. That the service be physically of as high a quality as is commercially desirable and practicable and that it be of that physical quality best adapted to meet the economic demands of the community.

3. That the service be of such territorial extension that every member of the community find the service wherever he may need it within geographical confines of the community; provided, however, that in seeking to reach the location of every member of the community, diffusion and extension of the service be not carried to such an extent for the slight benefit of a very small minority as to be unduly burdensome upon the greater interests of the great majority, but taking into consideration the fact that a community is ultimately benefited by constantly carrying some current burden for the development of its suburbs.

4. That the service be so conducted as to economically play as large a role in meeting the demands of the public for artificial light, heat and power, as will be beneficial commercially and otherwise to the community and beneficial to as great an extent as possible.

5. That the amount of average price per unit of service paid by the community to the lighting corporation be as small as is compatible with the service as rendered.

6. That the relations between the public or its officials and the public lighting corporation be placed and maintained on such a plane as not to act injuriously upon the moral status of the community or its officials.

Considering these essential points of interest separately we should endeavor to work out means for the utmost cultivation of each item in view of the others.

1. In present practice, the usual means to effect the proper degree of safety of the service are, primarily, restrictive legislation or ordinances and in rarer cases damage suits; it is unusual that restrictive ordinances fully effect their purpose without incidentally imposing economically undesirable burdens or restraints. These burdens could be minimized if penalties for specific fault or injury predominated over ordinances, which latter may or may not be effective and practical in their operation. The policy of holding a corporation liable for damage instead of circumscribing its actions by physical restrictions and ordinances is especially effective when the relations between the corporation and the public are such that damages or penalties paid come out of net earnings over operating expenses and interest charges instead of being charged into operating expenses where the interest rate is essentially guaranteed in conjunction with its being specifically limited.

2. The degree of physical excellence of the service is a matter which is limited by the state of the art and is, rightly or wrongly, controlled mainly by the demands of the public. That these demands, formulated by laymen, are not always for the best interests of the public is but natural. That prescriptive and restrictive legislation thereon may be detrimental to the ultimate best interests of the public follows, because of the usual lay origin of ordinances being on physical quality. If the non-monopolistic and keenly competitive character of the public lighting busines is borne in mind, the natural conclusion is that competition with the other agencies for light, heat, and power, will automatically produce the desirable degree of physical excellence.

That the public is frequently not competent to appreciate what physical qualities will best serve its interests, is instanced by the persistent demand for gas of high candle power, and that readjustment of this feature in the interest of the public is retarded by ordinances enacted at an earlier state in the art is evident.

The service should be "of that physical quality best adapted to meet the economic demands of the community." Gas was once used entirely for direct illumination by being burned in open flame burners. Then the public was best served, within physical and financial limitations, by the higher candle powered gases. But to-day, frequently half the sales of gas to a community are for heat and power and at least a third of the other half sold for illumination is used in connection with mantle burners for its calorific effect, and in which a high candle power gas, is, if anything, detrimental. Still, two-thirds of the total sales are unnecessarily burdened with a candle power expense simply because those using one-third or less of the total sales refuse to burn it in the most efficient manner and persist in doing as their grandfathers did. That existing ordinances retard the industrial betterment which should be wrought for the community by dropping the old candle power standard and its unnecessary expense to the community is evident. It is but natural to infer that, were this situation properly understood by the public and the corporations, it would rapidly be adjusted to the profit of the public and corporations alike, provided the corporations could see any gain to themselves which would warrant the travail of the transfer and readjustment period and were they free from legal hindrances. With this as an instance of the public misconception as to the physical qualities of service best suited to their wants, one is drawn to prefer a minimum emphasis on ordinances regulating physical qualities and a maximum latitude and incentive to automatic adjustment with a view to giving the public that service best adapted to meet its economic wants. The incentive to this end will come mainly from an opportunity to so adjust the service as to compete profitably with other agents, that is, to render an equal or greater service on better terms to the public and at a profit to the corporation.

3. The degree to which the territory of a community is equipped with means of drawing on the central station for light, heat and power has a deep effect upon its well being and growth. As was found in Philadelphia, when the gas were under municipal management, the building up of the suburbs is retarded by their lack of public service connections and facilities, and thus not only is the improvement of real estate slow but congestion of the population in the area having public service facilities results. As an instance of this we might cite Glasgow, where over 80 per cent. of the population live in tenements of 3 rooms or less, which alone would account for Glasgow's high percentage of certain contagious diseases.

The general and sectional interests of any community would call for public service equipment to precede sectional or suburban development, and thus stimulate the latter.

When a corporation has been legislated into operating at cost (which is operating expenses plus interest on investment) there is no incentive for it to take on new business, especially if this cannot be obtained except by having investments for extensions precede the business in sight. In fact, certain opinions of the Supreme Court would protect it from any attempt to force it to make investments of this nature unless resulting business met at least expenses. In order to best meet and serve the interests of the community in this matter, it is of prime importance to the community that there should be sufficient inducement in the form of some future profits to the corporation to warrant if in keeping its extensions up to the demands for suburban service. Furthermore, the prospective profits should be great enough to induce the corporation to extend its service in advance of the demand for it, thus making its installed service one of the stimulants to the upbuilding of the community to the still greater benefit of the latter.

An interesting corollary to this is the fact that municipal enterprises are usually remarkable over corporation enterprises for their slight and slothful extensions from the denser centers of population into the suburbs. This is because most cities are usually hard put to meet their current budgets, and therefore have no money for extensions except that they raise it by a bond issue or by raising the tax rate. This course, as well as any large expenditures for extensions, invariably tends to make the current political incumbents unpopular with the majority of the community. It is, therefore, usual in municipal enterprises that the public service is sacrificed to keep expenses down or "pickings" up, while extensions remain unmade and plants are allowed to deteriorate.

4. The interests of the community are bettered by its being served in as large a degree as possible by a public lighting corporation, under proper conditions.

That the public avails itself at all of the service furnished by a public lighting corporation is in itself conclusive evidence that it finds physical and financial profit to itself in availing itself of that service rather than of the many others at its command. That many times the original use of the service is made by the public prove, not that the public lighting corporation may have monopolized the business but merely that the public lighting corporation is rendering a service to the public and effecting a saving, profit, or betterment for the public in proportion to the public's use and choice of the service over other agencies of light, heat and power. It is therefore of vital importance to the community that the public lighting corporation spare no pains to legitimately increase its sales or service to the community by whatever means are proper and expedient, because every additional sale means that a member of the community has chosen the public service over other agencies at a direct saving or improvement to himself and therefore in the aggregate to the community.

The initative necessary to effect this condition, which we will describe as the economic saturation of physical sales, cannot be supplied or substituted by any form of government regulation as yet evolved, unless some incentive or profit shall be allowed the corporation. On the contrary, regulation unaccompanied with the incentive of further gain has frequently a tendency to discourage and impede the volumetric development of the lighting business. It does this first, by so insisting on and necessitating the most rigid economy of operation that the expenditures necessary to a thorough development of the volume of the trade are not allowable. Second, by interfering in matters as intricate and vital to development as rate-making, with but slight understanding of the problem, and third, by removing all incentives to increase by legislating prices down to costs, as previously described. In so doing, it must be that many of the laws of industrial economics are overlooked in the heedless desire to immediately reduce a tangible price The failure of any system of regulation which seeks to stimulate sales or service, except by making them mutually profitable to the public and corporation alike, is in its constitution. But grant the one modification to the effect that the corporation may make profits in proportion to the service it renders and the savings it effects, and immediately the corporation is galvanized from inertia into activity, yielding profits or savings to the community which the latter was not in a position to effect save only through the initiative of a public lighting corporation.

This one feature of the amount of service a corporation renders a community when properly considered by itself would seem to outweigh the isolated item of specific price, and when taken together with the three other preceding items of vital interest to the community, "price" should be the determined compound product instead of being, as is too often the case, the determining prime factor.

5. Regarding the price, it may be said that the gross income or total net average price per unit of service which is received by a corporation is the paramount consideration which determines its ability (or the ability of a municpal enterprise, unless subsidized by taxes) to render public service in a reproductive undertaking. That in equity and under the law this should meet at least all real costs is self evident. The question for the community to decide is: "Is it best for our immediate and ultimate interests, viewed entirely selfishly, to insist on and effect if possible, a gradual or immediate reduction of the gross income or average price received by the public lighting corporation for whatever service it may now or shortly render us, reducing this forthwith to the minimum figure legally possible under the federal law—that is, to bare costs, as necessitated by current operating expenses, depreciation and the market rental value or current cost of the moneys it has invested in our service?" If the sole point of interest to the community is the immediate minimizing solely of the present cost to itself of the present quality and quantity of service, regardless of any other considerations, then this policy of reducing a public service corporation to a bare cost basis would be warranted. When this is done, reliance is placed in prescriptive ordinances to minimize danger and to maintain the quality, the availability and the volume of the service. These ordinances are then enforced in the ultimate not by specific penalties which go into current operating expenses, but by the constant threat to the corporation that, unless these requirements are met, it will endanger its investment by inviting competition or municipal ownership. But apart from trials eventuating in this ultimate danger to capital, there is no reason for the corporation to maintain the quality and quantity of its service, if it is operating on the basis of bare cost—and much less is there incentive to its bettering the the service of the public when all betterments accrue to the advantage solely of the public and produce only more profitless work and risks of capital for the corporation.

Reference might, in this connection, be made to the fourteenth amendment to the Constitution of the United States, which provides that private interests shall not be deprived of their property rights except by due process of law and with just compensation. This has

been interpreted by the Supreme Court to mean that enactments which deprive vested capital of a "fair return" are unconstitutional, a fair return being that normal rate of interest which money commands in the open market. This provision is a favorite butt for the socialist, who points to it as an index of the supposed subservience of our federal government to the moneyed interests. The "fair return" interpretation means merely that no process of law shall force the performance of a service, involving the use of capital, *for less than cost*, a "fair return" on the invested capital is as much a necessary part of the current cost as are labor and material.

Furthermore, the constitutional question may well be raised as to whether the fourteenth amendment does not limit enactments which deprive private interests of present property values made with propriety by personal endeavor in, let us say, the public service, especially when said personal endeavor has bestowed equal or greater returns upon the public.

Consideration of these conditions might bring into grave question the constitutionality of many restrictive clauses in certain franchises and contracts as well as of certain municipal ownership laws or proceedings.

Adjustment of Price.—To return to the specific consideration of the price question as raised by the selfish interests of the public, it should first be said that the public served as distinguished from the investing public need take no cognizance of or interest in capitalization excepting in so far as the latter affects or may affect price under the fourteenth amendment.

It was above pointed out that while to reduce a corporation to rendering service on a basis of the bare cost thereof might be legally and economically possible, still, to do this removes all incentive for the corporation to render a safer, better, broader and bigger service. In recapitulation of those functions of the public lighting business in which the public is vitally interested, we may say that they are:

1. Safety of physical operation.

2. Excellence and adaptability of physical quality to the wants of the community.

3. Breadth of territorial expansion carrying with it the service of as many individuals in the community as possible.

4. Large volume of trade or service rendered indicating economic utility to the community.

5. Minimum price per unit of service compatible with the preceding items of interest to the community.

1. The attempt has been made to show that the safety of the service can best be worked out by severely penalizing the corporation for actual damage done rather than by prescribing and restricting the physical methods under which it shall conduct its business, penalties being deducted from net earnings over total costs. This of necessity calls for there being a possibility to the corporation of its making said net earnings over bare costs.

2. With regard to the excellence and adaptability of the physical service rendered, it would seem to be a fact beyond dispute that if a corporation sees for itself an earning commensurate with the business it does in serving the community, competition would make it adapt its physical means to this end with much more rapid flexibility and to a much closer degree than can any prescriptive legislation, especially when the latter is of lay origin. But to obtain this eagerness on the part of the corporation to best adapt its service to the wants of the community, the corporation must see a profit to itself in better serving the community.

3. The civic and economic conditions of a community are best served by having its public service facilities spread broadcast throughout the territory and available to all. To do this invariably calls for the equipment of outlying territories being made in advance of the development of that amount of business in said territories which would meet current expenses and charges incident to the equipment and service of the suburbs. Unless there is the incentive of gain, a corporation would be comparatively slothful in extending its equipment—as in fact are most municipal enterprises—since there might be no future profit to offset current losses made in making said extension. In fact, unless there is an incentive of profit over cost the advisability of investing capital in extensions is open to doubt.

4. It is obvious that the more business a community does with a public service corporation the more profit does it find as a whole in being served by the public service corporation.

The adjustment of matters in such a manner that the volume of trade is expanded to the utmost possible extent is dependent almost entirely upon the initiative and ability in the public lighting corporation. That it should take a financial risk and under great managerial difficulties seek to do more business when the latter will bring no return over costs is not to be expected. But if it can see a fair profit to itself over costs, it may be relied upon forthwith to avail itself of every opportunity to do more business because of the increased profits which it expects therefrom.

5. Now, in the four functions above considered we have four things, in each of which by itself the public as a whole is interested to a greater or less extent than it is solely to the item of price. These things mean more to the public now, and especially in the future, than does the immediate price, and yet not one of them can best be worked out unless the present and future price relation shows a net profit to the corporation over and above operating expenses and current interest charges on the moneys invested.

While the above items of public concern have been considered as apart from the price function, it should be remembered that there will be no expansion of the volume of business unless "the price is right" to the community; that is, unless the price is such as to show the community a profit or saving to itself in doing more business with the corporation. Beyond doubt, every one of the four functions above considered can be worked out to the best advantage to the community by allowing the corporation a profit over and above costs.

While the community may have the power to legislate and force the price down to bare costs, to do so is to "sell its birthright for a mess of pottage," because it thereby subordinates the present and future safety, quality, extent and volume of the business, and also the future price, to the short-sighted consideration solely of the item of the immediate cost to the community. That this is worse than short-sighted is evidenced by the fact that in legislating present prices down to present costs, it gains but a small amount—let us say a few cents per 1,000 cubic feet on the present comparatively small volume of business. By now destroying this former profit, it takes away all incentive to betterment on any lines and thereby loses more than it gains, because there will be little betterment or extension of the now profitless service. Therefore, future development of the service is almost penalized and future reduction in price and cost are indefinitely deferred. The opportunity to in future receive a much greater service at a lower price per unit has been thrown away for a much smaller immediate reduction in price.

The best interests of the community call for an incentive to the public lighting corporation to render the community a safer, better, broader, bigger and cheaper service.

The degree of the incentive of profit necessary to accomplish these results ranges from bare costs to the corporation to that cost which the community would incur in obtaining equivalent service from other private sources or in providing itself with equivalent service by means of municipal ownership. It would seem, therefore, that the selfish interests of the community might best be served by so arranging its price relation with the corporation that both find individual profit or saving at the terms agreed upon. These should be such that the corporation will receive all the stimulus necessary to make it to act as to best serve the public in every vital respect. They should furthermore be such as will permanently maintain this corporate activity "for the public good."

Under such system, developed with a recognition of some of the economic principles above outlined, public and corporation alike may share in the increment of profit effected for the public by the corporation, which profit would not be effected save by the initiative of the corporation, nor could the public gain this saving except through the activity of the corporation.

From a general consideration of the above outlined principles and economic forces, one might draw the following contrast:

The only advantage gained by the community in forcing the price down to such terms that the lighting corporation makes no net profit are:

1. That the community immediately saves an amount equal to the former profit of the corporation, this amount being equal to the difference between the latter's gross income and its operating expenses, plus normal interest charges on its investments.

2. That by this reduction in price, however slight it may be, a somewhat greater use of the public lighting service can be made advantageously to the community.

3. That because of this somewhat greater use the community effects a saving to itself equal to the difference between the cost of this increment of use and the cost of such facitities as were thereby displaced.

These items of immediate benefit to the community must be offset against the following:

1. Because the corporation is reduced to approximately a cost basis, a more or less expensive system of supervision, investigation and con-

trol must be maintained at the expense, in the ultimate, of the public.

2. Because the incentive of private gain has been removed, the corporation will not, to the utmost, develop means for rendering the greatest possible service of advantage to the community by larger sales, which merely mean greater public utility.

3. Because the incentive of ultimate gain to the corporation has been removed, it will not risk capital in carrying its service into the suburbs in advance of such business as will currently pay its own way. Congestion of the center and stagnation of the suburbs results.

4. Unless profit is allowed it, more successful competition means nothing to the corporation. It will therefore not seek out every way in which it might give a better service and a service better adapted to the economic wants of the community.

5. If penalties for physical injury are specific and severe and are taken out of allowed net profits, the tendency would be to evolve a safer service than if damages had to come out of protected costs because no net profits existed.

6. If the corporation were allowed the incentive of profit and were allowed sufficient latitude, modern methods point to the conclusion that it will, for profit to itself, ultimately lower its price below its former cost by developing its business in a wholesale manner.

Generally speaking, the public lighting business is to-day on the basis of comparative small sales and comparatively large and necessary interest charges per unit of sales. Modern methods, if allowed to, would develop this to comparatively large sales, bearing comparatively small interest and profit charges per unit of sales. It would, indeed, be safe to say that the business so developed, the average total price per unit of sales composed of expenses, charges and profit, would be greatly below the present average cost price if composed only of expenses and charges. But this development and metamorphosis cannot be effected by the "big stick" of goverment regulation on the basis of bare costs. It rests almost entirely with the corporations to bring it about, but to enter upon the risks of money and labor necessary thereto the corporations must see a profit to themselves in accomplishment.

Consideration of the question of labor in its relation to the public lighting corporation and to the public has been purposely omitted from the statement of those items of the public lighting business in which the public has direct and specific concern. From the sociological point of view, it is true that the public has a direct concern and interest in the conditions of employment of all its constituent members, which, of course, includes those in the public service undertakings.

But those employed, say, in the public lighting business, hold their individual economic status as producers because of their activities in this field of effort. It is because of the work they do as integral parts of the public lighting corporation that they hold their right to be considered by the public as workers for the public weal, instead of as drones and pensioners from the public purse. Therefore, it is primarily as integers of the public lighting corporation and through that as members of the economic community that they should be considered by the public.

As to the terms of employment in the public lighting business, it can to-day be said with assurance that every man employed therein receives at least more than a living wage, and that the average wage, excluding officials, is above that of the community as a whole, and this is because the technicalities of the business call for a high grade of labor for their safe and proper execution.

In addition to this condition, which might be described as the routine aspect of the business, the relation and attitude the public assumes to the public lighting corporation may have a very vital effect upon the attitude of the corporation to its executive parts—its officers and employees. If the public insists on grinding the corporation down to the minimum costs at which it can operate, the corporation may reflect this attitude in its relations with its employees by getting the cheapest men instead of the best men. But if the corporation is allowed an incentive or profit in better serving the public, as above outlined, the public may confidently rely upon the corporation to extend similar inducements to its employees, because thereby will the selfish ends of the corporation best be served.

The corporation seeks increased net earnings or profits obtainable by improving and increasing the service at an ever-decreasing cost and price per unit of service. Its principal means to this end are in the employment, not of the cheapest men, but of the best men, the most efficient men. Such men, like the corporation itself, if given the incentive of personal gain and advancement in proportion to their individual accomplishments in the betterment of the service, will so strive as to most better themselves and the service of the public. Under such conditions an improvement and cheapening of the service and a bettering of labor will be carried much farther than would have been possible had the public deprived labor of most of its incentive by first depriving the employing corporation of any incentive to work for the betterment of the public service.

The ethical aspects of the relations existing between the public or its officials and the public lighting corporation fall perhaps outside the strict scope of this paper. It may, however, be pertinent to remark that "honesty is the best policy," especially where relations are to be long enduring. In effective and ultimate results, questionable practices are to honest methods as the bully is to the able manager who points out to his opponent their real and mutual interest. The bully may get immediate though temporary results. The able manager will turn a suspicious enemy into a sincere friend. The latter relation of mutual respect and confidence must be established and fully maintained before the real interests of the public and the public lighting corporation alike can be attained and permanently enjoyed by both. Therefore, any public officer who inaugurates or participates in questionable relations with a public service corporation subverts not only the immediate but also the ultimate interests of the bublic. Also similar action by a corporation would be but sacrificing its future gain and security to immediate results. Likewise any unwarranted public attack upon a public service corporation, while it may assume the form of being *pro bono publico*, is in effect an attack upon the interests first of the public and incidentally of the corporation.

Discussion.

The President—This is a most interesting paper and I am sorry we have not the time to discuss it as it should be discussed. We must adjourn at half past one to accept the invitation which we have received to go to the East End Works of the Cincinnati Gas and Electric Company in response to the invitation of the local entertainment committee.

Mr. Tuttle—Mr. Gardiner spoke of the Massachusetts Gas Commission. I have the greatest respect for the Massachusetts Gas Commission, although I think they are working with their hands tied more or less. I would like to present a striking criticism of what is going on along that line. The article which I am about to read came to my attention a short time ago. It is an extract from the *Saturday Evening Post*, Jan. 28th, 1905, by Charles G. Dawes, former Comptroller of the Currency, and is headed "Roosevelt and Corporation Reform. Practical Problems for the Investing Public." It is as follows: "We have in this country a good illustration of the adverse effects upon the public of what may be considered the paternal protection and regulation of the capitalization of corporations operating natural monopolies. This is the Massachusetts Gas Commission Law. Many economists have long praised this law, professing to see in its limitations upon the rights of capitalization and the rate of earnings thereon, benefits to the community. Within the next few years, however, if not sooner, I think impartial economists will be practically a unit upon the failure of the law in its present form, properly to conserve the best interests of Massachusetts gas consumers. The criticism is not of the right of the Commission to regulate prices of gas but of the policy of regulating capitalization. The effect of the Massachusetts law has been to discourage proper efforts to better the service or reduce rates after the stockholders receive the limit in the rate of dividend legally allowed them. Massachusetts gas consumers as a whole are now being injured in the matter of both gas service and gas rates as compared with companies in other cities, operating, some of them, under restrictions as to rates, but all without restrictions upon the right of capitalization. As someone has said, the many Massachusetts gas companies paying thsir regular dividends upon their limited capitalization, havc gone to slecp. Many of them, if notified simultaneously of compulsory cheaper prices for gas and freedom to capitalize in any way they pleased, provided it would not involve fraud on anyone, would immediately modernize their business, increase their mileage of mains, and better their service in order to induce the larger consumption necessary to reduce the cost of production and to produce the old or a larger rate of profits. Leading economists are already recognizing the defects of this law formerly so universally praised. Its main defect is interferance in capitalization designed to prevent stock watering. It prevents it, but by so doing it interferes with the proper protection which the Commission should afford the public in the way of imposing reasonable rates upon the gas companies."

Mr. Bullock—Not that Mr. Gardiner needs any verification in his argument in opposition to municipal ownership, yet as I heard Senator Tillman, of South Carolina, say in presenting some more cases in support of a speech of Senator Bailey, "He said all that was necessary, but I will pile up some more evidence." I just wish to read an abstract from a letter written by a chairman of a lighting committee of a municipal plant, relating to the services of a superintendent of construction. It is as follows: "I do not doubt for a moment but that he could have made himself very valuable to the city and more than earn his salary, but where all the personal interests of the council have to be considered, I am afraid that the chance for making the new gas plant a big success is at this time very slim." That communication is signed by the chairman of the lighting committee.

Mr. Gardiner—In answer to what Mr. Tuttle has said, I would like to say that the Massachusetts Gas Commission is a body for which, both individually and as an organization I have the highest respect. They have done a work the value of which perhaps is in excess of the value of the work done by any other body of men having similar means

at hand that I know of. The value of their work to the public and to corporations I think cannot be overestimated. They have established a position of mutual respect as between the public and corporations which is of the utmost value to both. We are carefully controlled in matter of our meters for instance. Our meters are all tested by representatives of the Gas Commission and are officially pronounced right by them, so that no question can be raised as to the accuracy of our meters and we stand ready, at all times, to make proper readjustment if they are found to be in any way inaccurate. The same applies to lighting conditions. With the recent development of gas and electric lighting business, has instanced for example in the English movement of controlling prices, through the action of profit sharing and sliding scale, there can be no question, it seems to me, of the great value of the system of the Massachusetts Gas Commission, and I would like to see its usefulness extended.

Mr. Faben—We are still living on earth and we have to treat with humanity. The paper presented by the gentleman is certainly valuable from a theoretical and economical standpoint. Out here in Ohio we are held down by statutory enactments and have to live out our extence the way I presume they lived a great many years ago. We have to meet city councils and treat with our neighbors right at home instead of through a commission. I am in favor of a State Commission, but as the hour is growing late I desire now to move a hearty vote of thanks to Mr. Gardiner for the very valuable paper, and the most excellent contribution he has presented to us, and by which we have been instructed and entertained. (Adopted.)

The President—Gentlemen, Mr. J. M. Robb, of Peoria, Ills., has prepared and presented one of the most interesting papers I have ever had the pleasure of perusing, on the subject, "Instructions to Gas Distribution Employees." Mr. Robb is unable to be present at this meeting, but I would like to entertain a motion that his paper be considered as read, and that it be embodied in our printed proceedings. There is not a member here who will not be entertained as well as profited by a perusal of this most carefully prepared paper.

It was then moved, seconded and unanimously adopted that the paper of Mr. Robb be considered as read and embodied in these proceedings.

(To be Continued.)

[Prepared for the JOURNAL.]

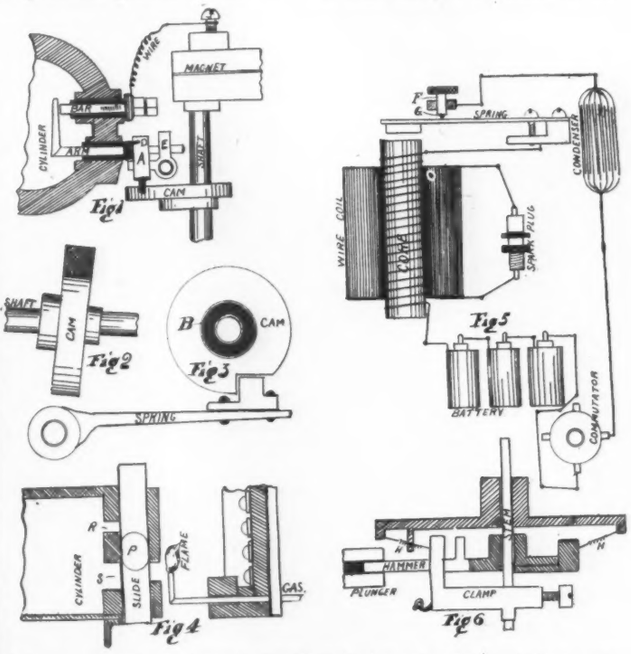
Chats on the Gas Engine for Gas Men.

By "TRAVELLER."

With the ever increasing installation of gas engines for automobiles, for boating purposes and for the industries, gas men are getting more deeply involved. To-day, one may find many gas men who are interested in the gas engine, and who are experimenting with new ignition devices or sparking attachments during spare hours. Other gas men may be met who are handling gas engines as a side line to regular business. You can find publications on the gas engine on the desks of the gas manufacturers, all of which indicates the fact that the gas engine is firmly seating itself in the gas industry. Among other interesting factors appertaining to the science of using gas for exploding purposes in the cylinders of the engines for the many different purposes to which the gas engine is put in these times, is the observation of the ignition system. The mechanism of the steering gear, the brake system, the speed element of the machines and the like are not of great concern to gas men. The gas ignition and explosion part is of considerable moment. Formerly the men who undertook to invent proper sparking devices were not electricians if gas men, and not gas men if electricians. Many of the gas engines were operated by means of gas, as in the Otto type, which used a constantly burning jet outside the cylinder, and by means of a sliding device, the gas inside was charged at stated intervals. At first the mechanism would cut off itself and stop the machine. All this has been overcome.

A hot tube of the Bunsen burner type was also used for igniting the gases. Then the system of electrical charging was introduced. The operation in detail is exhibited in Fig. 1 in which the cam is caused to revolve on the shaft in the position shown. As the cam turns, the hammer *A* is lifted against a spring of the spiral pattern which is adjusted at *D* in such manner that the sliding arm is made to move outward or towards the bar. This makes the circuit complete and the current passes so long as the end of the arm and the bar are in contact. The clamp *E* now causes the release of the spring and the arm and the bar are separated. The spark is produced at the breaking of the circuit inside the cylinder and the gases are charged. There are various reasons why the device fails to work right. In the experimenting department of a certain gas manufacturer, an engine was retarded from working evenly due to the disturbed position of the cam. The sparking was irregular and sometimes cut itself off entirely and the engine would stop. The make and break sparking system must of necessity be uniformly operated. With the cam tilting on the shaft as in Fig. 2, this could not be done. The remedy was obtained by removing the cam for the purpose of reboring the hole. Then in order to take up the portion thus removed and secure a perfect fit, the bushing *B* was inserted and shrunk into the bore as in Fig. 3. Referring to the slide valve ignition method, we find that the gas jet is as represented in Fig. 4. The charging port is marked *S*. The igniting port is at *R*. The transfer port is in the slide opening at *P*. The flame is shown opposite the recess which admits to the transfer port at the right interval in the movement of the slides. When the mechanism of the device brings the transfer port in right position, the opening fills with the gases and the latter are ignited by the flame. The charge is quickly transferred to the inner ports and the necessary explosion results. In the operation of these devices, trouble often ensues because of defective adjustment of the slides, or because of binding parts or gummed parts. Often an engine is found idle due to clogged, gummy lubricants about the slides, thus prohibiting the free operation of the same. In Fig. 5 we present a diagram which is specially arranged for gas men, to illustrate the vibrator and its interrupter. The connections of wire can be observed by the plan. The vibrator blade is made amply elastic to permit pulling down and quick return when released. When the blade is down and the contact made with the core, the coarse wire of which this core is made is acted upon, and the coil is interrupted. The condenser then takes the current which is endeavoring to follow. The interruption having occurred, and the magnetism of the core having been interrupted thereby, the vibrator blade assumes its normal position. This results in a uniting of the current or a re-making of the circuit once more, followed quickly by another pulling down of the blade so that another operation may occur. Thus we get the constant repetitions, and these are effected so fast in the modern engine that a harmonious humming sound is produced.

Great care in adjusting is essential. In fact, the adjustments are watch-like in their character. A single turn of a screw will disturb the regularity of the mechanism and make the machine imperfect in its action. The distance-adjusting and contacting screw is marked *F*. The platinum point is signified *G*. We next show a sketching of an



elevation of make and break sparking device of modern design. The stem extends up to the insulated anvil above. The anvil is maintained just out of contact with this arm or stem. The spiral springs of the form shown at *H, H*, are used for the purpose of holding the clamp and hammer together until forced apart by the drop of the hammer at the required moment in the action of the mechanism. When the plunger falls, the points of stem and anvil are brought together, and the spring of contact is strained to proper place. Then the hammer rebounds and the contact is broken and the spark is made.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. J. F. PORTER, representing the Tri-City Railway and Light Company, has formerly taken over the control of the Davenport Gas and Electric Company, of Davenport, Ia.

NEGOTIATIONS are under way for the merger of the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md., with the Consolidated Gas Company of the same city.

THE Shawnee (Okla.) Gas and Electric Company's new coal gas plant has been started.

MR. W. H. WILLIAMS, State Labor Commissioner, expects to be a candidate for Mayor of Minneapolis, Minn., on the Municipal Owner-

ship platform and has his eye on the purchase of the Minneapolis Gas Light Company, expecting to purchase same upon municipal account in 1910 when the Gas Company's franchise expires, maybe!

It is pleasing to learn that San Francisco is again partially served with gas.

Some cities seem to have money to burn. The Buffalo, N. Y., aldermen have voted $5,000 to pay for the investigation of the Buffalo Gas Company by the State Commission.

The Enfield (Mass.) Construction Company has purchased the Enfield Electric Light and Power Company.

The Southwestern Electric and Gas Association opened a 3 days' meeting on May 15, at Galveston, Tex.

Paulsboro, N. J., has decided to build its own municipal gas plant and have issued $30,000 worth of bonds for this purpose.

The Boyerstown Gas Company of Boyerstown Pa., has petitioned the Governor for a charter to supply gas, light, heat and power to the public of Colebrookdale Township.

Are vapors smoke? On the definition of smoke hangs a verdict for or against the Springfield (Mass.) Gas Company, whose vapors seem to be a nuisance in its vicinity.

The Natick (Mass.) Gas Company has placed an order for a new holder. There are other improvements in line for this town if we know the situation rightly.

The La Crosse (Wis.) Gas and Electric Company had quite a serious explosion in its purifier house recently.

Quoting from the Hartford *Courant* May 26, 1906, "the spectacle of General John P. Harbinson defending the rights of the people against the Gas Company, while members of the Landlords' and Taxpayers' Association stood up for the concern was an interesting feature of the Association's meeting." Landlord Griffing says, "it doesn't strike me that criticism comes with good grace from the former manager of the Company; it was only two years ago that he was manager of the Company and we didn't hear then that 90 cents was the proper price for gas." It is well known to all gas men that General Harbinson was president and general manager of the Hartford Gas Light Company for almost 50 years and his friends will be surprised to know that he is heading a movement for lower rates, and otherwise criticising adversely the present management, particularly as he is not now a user of gas.

A connection made with the abandoned mains at New Castle, Ind., has become a source of great menace, as the entire abandoned system is leaking.

The Consolidated Gas and Electric Light Company, of New York city, has completed negotiations for the lease of the Cincinnati Gas and Electric Company. The former Company guarantees 4½ per cent. on the latter's stock for the first 2 years, 4½ for the next 2 and 5 per cent. thereafter. The New York Company has an authorized capital of $20,000,000 of which $10,000,000 is preferred and the remainder common. The Cincinnati Company has a capital of $31,000,000 and has paid 4½ per cent. annually.

Mayor Brouse of Kokomo, Ind., is investigating the feasibiltty of repealing the franchise of the Kokomo Gas and Coke Company as a means of reducing the price of gas and the purchase of its plant by the city. This may be a popular move but hardly possible of achievement.

R. W. Colson and B. S. Pague, both endeavoring to obtain franchises for the distribution of gas in Portland, Ore., are very much disconcerted over the fact that one Thomas M Cusker also desires to sell gas for 30 cents less than either of the former two. These gentlemen are of the opinion that "two is a company and three is a crowd."

The Wakefield (Mass.) Municipal Gas Company, after its erection of a lot of second-hand apparatus, is making a strenuous endeavor to increase its output. Its manager, Mr. White, has a hard nut to crack.

The Gassaway (W. Va.) Gas Company has been incorporated and expects to build a plant immediately.

The Milwaukee (Wis.) Gas Light Company has purchased the northeast corner of Wisconsin and Jackson streets. It is reported that a 10-story office building will be erected thereon.

A franchise to install a gas plant at Columbia City, Wash., has been granted to Henry S. Miller and associates of that town.

Calumet, Mich., will have a new gas plant by fall. Construction is now under way.

Messrs. Garlow, Roen and George A. Scott have formed a company in Columbus, Neb., to build a gas plant in that town.

Every farmer on the line between Westchester and Downingtown, Pa., has applied for gas for cooking and lighting.

Mr. A. S. Maxwell is seeking a franchise in Beatrice, Neb., at the rate of $1 per 1,000.

The Barre (Vt) Gas Company has been bought by some Springfield, Mass., men who propose to make extensive additions.

The Bethlehem (Pa.) City Water Company is suing the Allentown (Pa.) Gas Company for damaging the water in the Lehigh river from which the former gets its supply.

The Genesee County Electric Light, Power and Gas Company is seeking a franchise in Batavia, N. Y., to supply gas and electricity.

The New Gas Company, which will erect a plant at Avondale to supply Southern Chester county, Pa., has begun active operations.

It is reported that the Bethlehem (Pa.) Consolidated Gas Compauy which is owned by the Wilkesbarre capitalists has been sold to some New York capitalists.

The price of gas has been reduced from $1.25 at Plainfield, N. J., to $1.15, and it is understood that in 1909 it will be reduced to $1 per 1,000.

Mr. William M. Cathels has been appointed superintendent of the works and distribution of the Hempstead and Garden City Section of the Nassau and Suffolk Gas Lighting Company, L. I.

H. M. Byllesby & Company, engineers, have removed their offices to the American Trust Building, corner of Clark and Monroe streets, Chicago.

Laurel (Del.) is considering the granting of a franchise to local parties for a gas plant.

Cold Water (Mich.) proposes to add to their gas plant installation.

Portsmouth, Va., has reduced the price of gas from $1.65 to $1.40.

Danville, Ills., has abolished meter rental and the price of gas has been reduced from $1.25 to $1.12½ per 1,000.

The Creston (Ia.) Mutual Electric Company has been granted a franchise to supply gas at Creston. The grant was strongly contested by the old gas company.

The Fidelity Gas Company, of Hoosick Falls, N.Y., has been sold to a party of New Jersey men, who contemplate making some works and mains betterment. The incoming officers are Joseph A. Duffy, of Jersey City, President; George A. Wardell, Secretary; Thomas J. Hinds, Treasurer.

The Poughkeepsie (N. Y.) Gas Light Company has adopted the following rates, for the first 3,000 cubic feet $1.20 per 1,000. In excess of 3,000 to 5,000, $1.10. In excess of 5,000 to 50,000, $1 net.

The reorganization of the Peublo Gas and Fuel Company has been completed by the election of the following officers and Directors: President Henry L. Doherty, New York and Denver. Assistant to the President, GeorgeWilliams, of Peublo; Vice-President, Frank W. Frueauff, of Denver; Secretary, Paul Jones, of New York; Treasurer and General Manager, Arthur N. Cantril, late of Grand Rapids, Mich.; Directors, Henry L. Doherty, Frank W. Frueauff, George Williams and V. H. Henderson.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aux. Siegel, 30 Lime Street, London.

MONDAY, JUNE 4, 1906.

The Market for Gas Securities.

Governor Guild, of Massachusetts, has signed the sliding scale gas bill making the price of gas in Boston, 90 cents per 1,000 cubic feet.

Consolidated gas sold up to 141 during the week, and closed to-day (Friday) at 139¾ to 140. All gas bills now issued by the Consolidated Gas Company contain the stipulation that the old price of $1 per 1,000 cubic feet will be charged, and that the amount in excess of 80 cents will be deposited with the United States Circuit Court pending the settlement of the litigation. Baltimore gas and Washington gas stocks are steady, at last week's prices.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 4.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	139¾	140
Central Union, Bonds, 5's	3,000,000	1,000	101	104
Equitable Bonds, 6's	1,000,000	1,000	..	105
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	225	250
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	100	102
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's	1,250,000	1,000	101	103
New York and East River .. Bonds 1st 5's	3,500,000	1,000	108	111
" 1st Con. 5's	1,500,000	..	104	110
Standard	5,000,000	100	140	160
Preferred	3,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	123	130
" " Bonds (5's)	15 000,000	1,000	108	112
Bay State	50,000,000	50	5/16	¾
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000.000	1.000	47⅛	50
Buffalo City Gas Co.	5,500,000	100	9	10
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	103⅛	103¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	..	95
Preferred	3,026,500	100	107⅛	108
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	82½	84
Mortgage, 6's	3,500,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg 5's	1,225,000	1,000	104⅛	106
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	107⅛	108⅛
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104⅛	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100		105
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	6,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	92	92½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	30,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104⅛	105⅛
San Francisco, Cal.	15,800,000	100	.	..
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¾	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,500,000	20	300⅝	301
First mortgage 6's	500,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	..

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(Continued on page 985.)

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(*Concluded from page* 984.)

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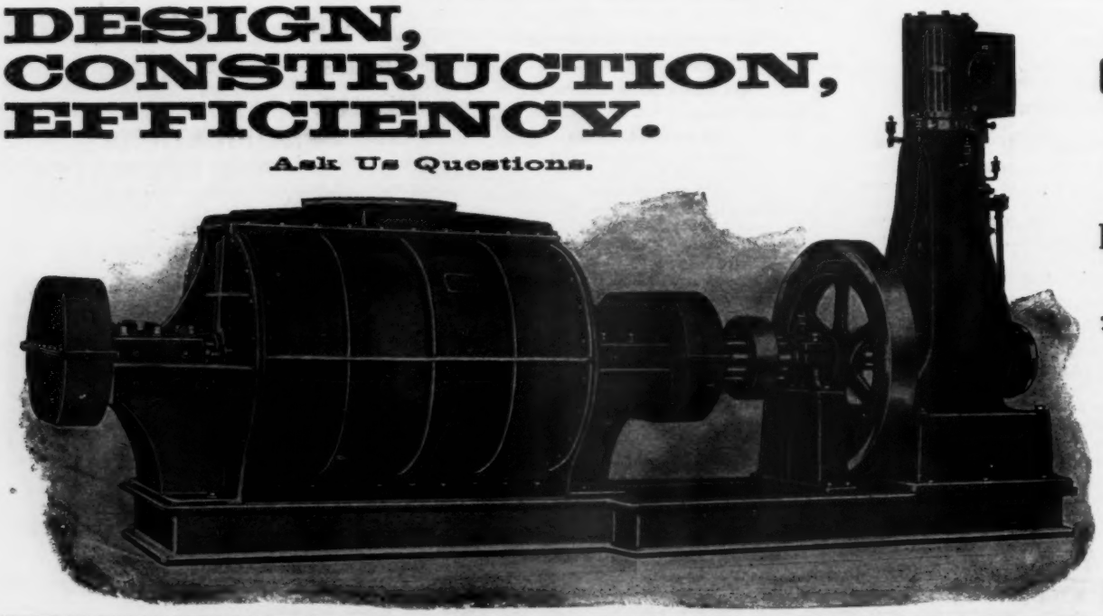

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" " "	3,500	" "
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Halifax Corporation	100,000	Carburetted Water Gas.
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DEAR SIRS:

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Yours faithfully, _____

DEAR SIRS:

In reply to your enquiry of the 27th March *re* Rotary Meter, I have not the slightest hesitation in stating that the meter we have in use here is giving every satisfaction.

It is 15,000 cu. ft. per hour and fixed at the outlet of Condensers of our Carburetted Water Gas Plant, and of course in the inlet of the Relief Holder, and is working under extreme conditions.

It is fixed underground, and since we have had it, *viz.*, 3 years, we have only taken it out once for examination (and this out of curiosity); as you will quite understand, there is a lot of oil, tar, etc., in contact with the meter at this point, and we thought it might be getting clogged up, but were pleased to find that such was not the case.

From our experience we have not the slightest hesitation in recommending its adoption to all gas makers.

I shall be pleased to reply further if necessary.

Yours very faithfully, _____

GENTLEMEN:

In reply to yours of March 27th respecting the Rotary Station Meter in use at these Works, I beg to inform you that the same has given every satisfaction. The meter has been registering the whole of the gas made at our Inclined Retort Section for the past 2½ years, and up to the present time we have not had the slightest trouble. The capacity of our meter is 100,000 cu. ft. per hour.

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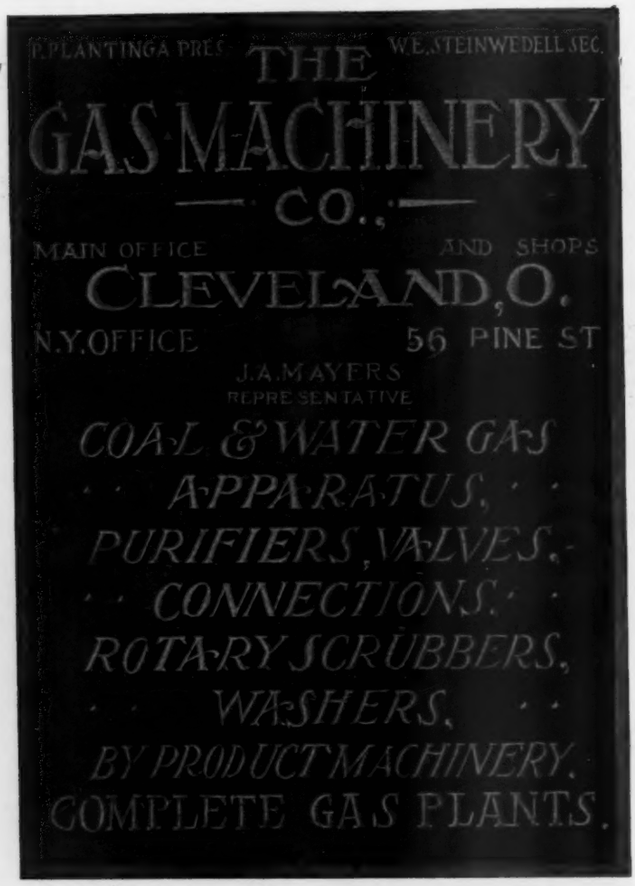

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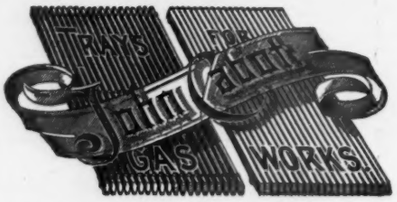

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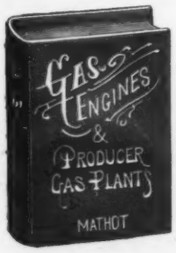

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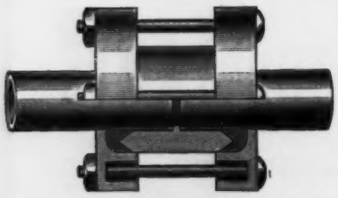
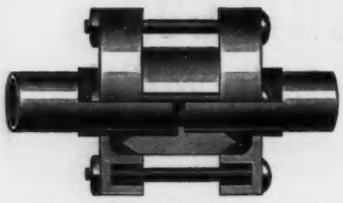
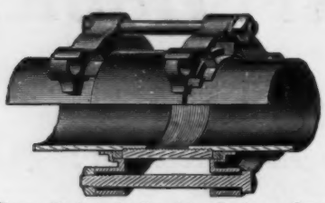

Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.


Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe,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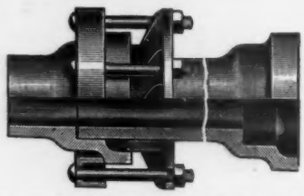
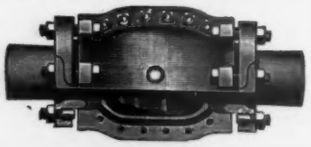

Coupling, Style 9, for Special Style Cast Iron Pipe.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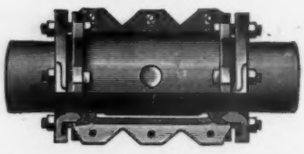
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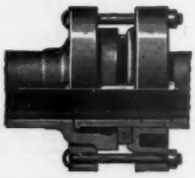
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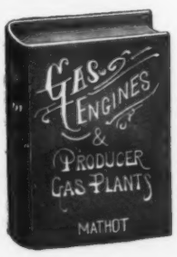

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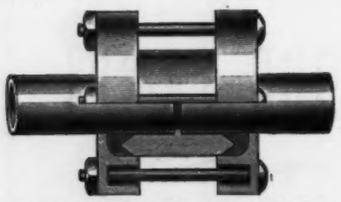
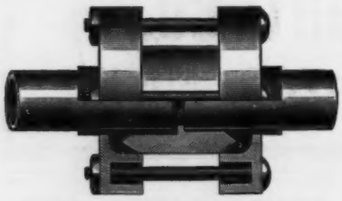


Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.



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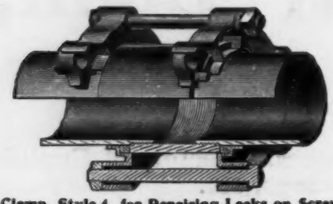

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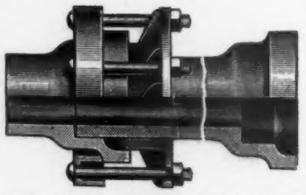

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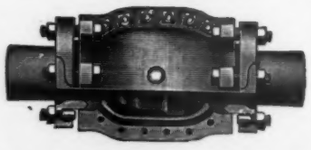

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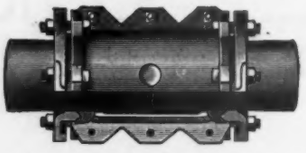

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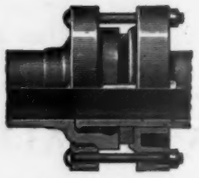

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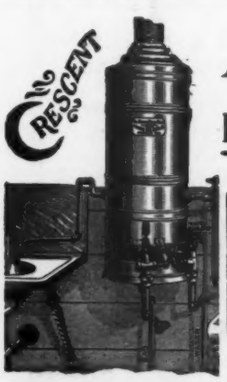

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Contact 6	28 00	¾ "	3	29¼ "	12 "	60 "
" 8	23 50	½ "	2½	28⅛ "	10¼ "	48 "
" 9	20.00	⅜ "	1	24 "	9¼ "	45 "

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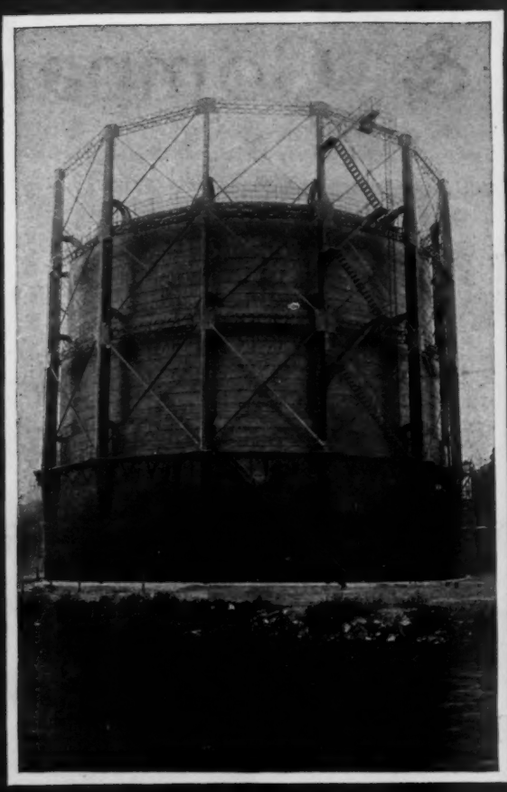

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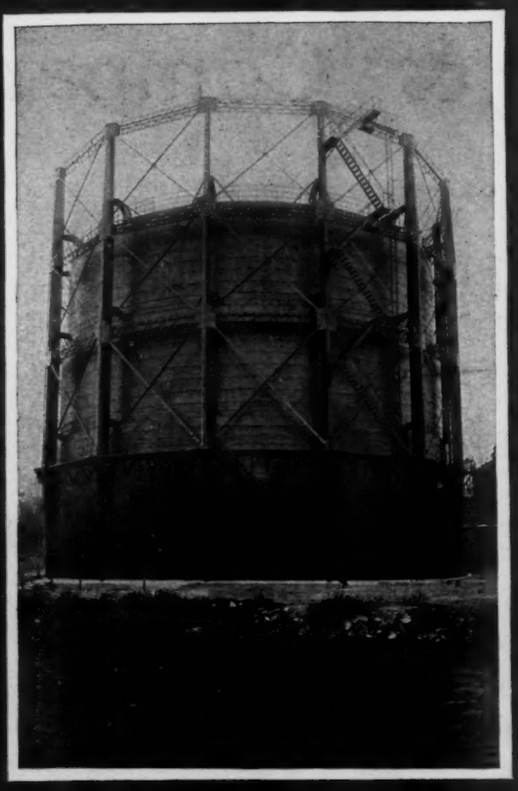

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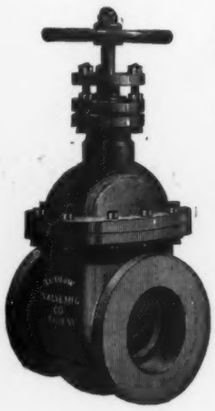

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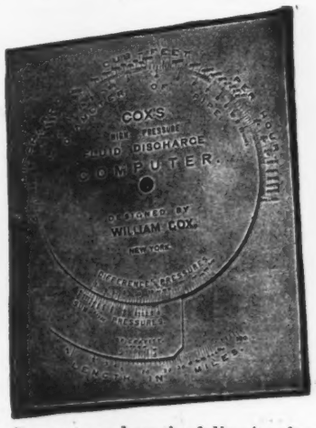

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Discharge in cubic feet per hour at atmospheric pressure $= 33.3 \sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$

Where
d = diameter of pipe in inches,
p_1 = absolute initial pressure in pounds per square inch,
p_2 = absolute terminal pressure in pounds per square inch,
L = length of pipe in miles,
w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;

(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;

(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and

(4.) Opposite any desired discharge will also be found the required diameter of pipe.

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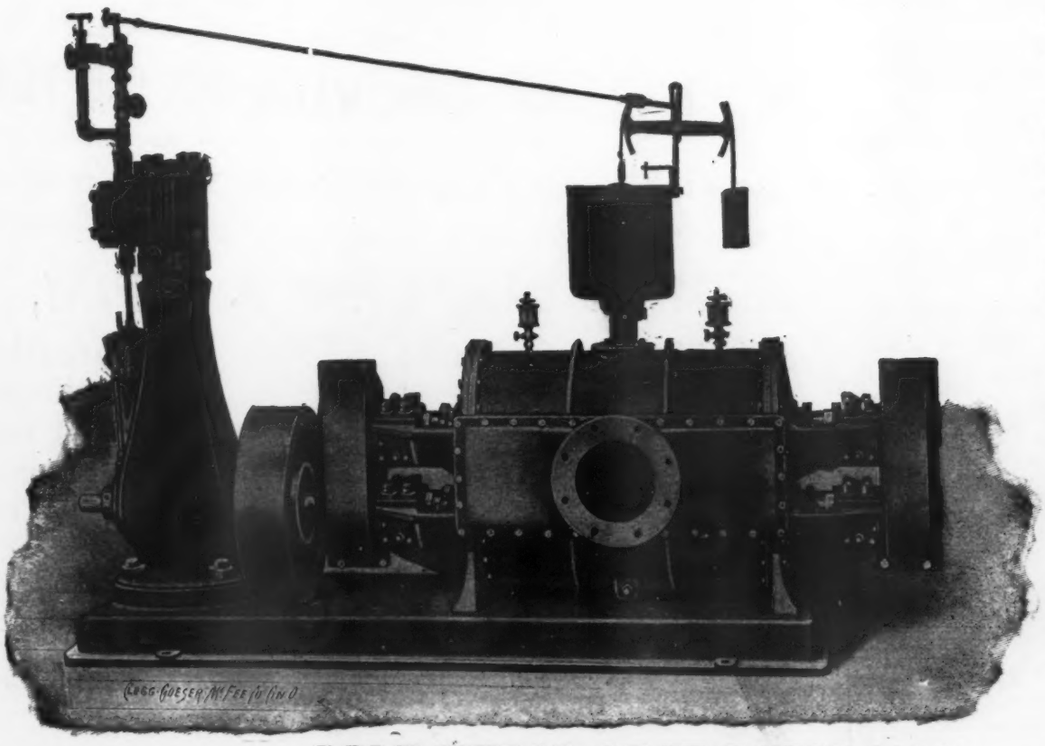

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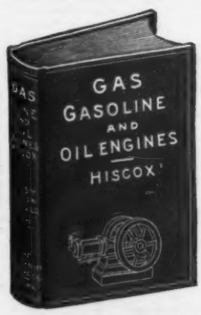

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Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

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Mueller Dry Pipe Tapping Machines, including the Mueller "Regular," "Our Special" and "Our Special No. 2," comprise a line unequal for their class of work. They are made strong, are easily attached to the pipe, and are easy to operate under all conditions of use. All dry pipe machines make taps from ¾ to 3-inch in any size of pipe. Unconditionally guaranteed. Catalogues upon application.

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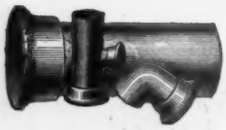

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For Shutting Off Gas in Mains

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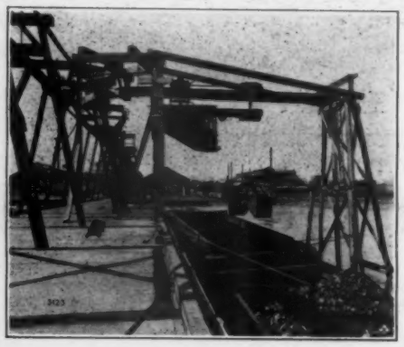

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All kinds of material can be transported by Telpherage.

Telpherage machine installed for the Philadelphia Quartz Co., Chester, Pa., for handling coal, sand, etc. To unload a barge or boat quickly this is the best method devised—and employed Electric capacity of 3,000 lbs. at 120 ft. a minute; the travelling speed 1,100 ft. a minute. Total length of line is 1,000 ft., three switches permit transfer to different parts of the plant.

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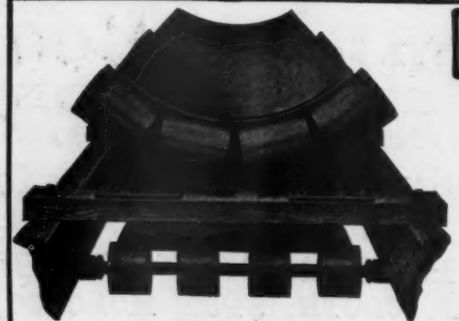
THE PURIFIED GAS REVIVES THE FOULED OXIDE.



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The positions of the rolls conform to a natural and uniform curve of the belt.

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Possess greater efficiency, consume less power, and the belts last much longer than when any other type of roll is employed.

Permit us to tell you why and to submit plans and estimates.

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AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

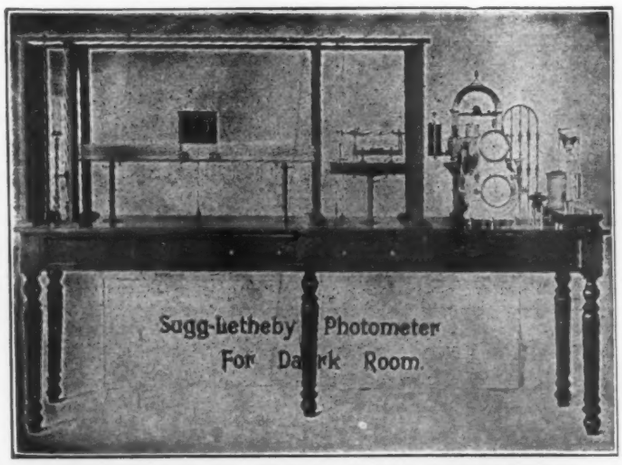
JUNE, 1906.

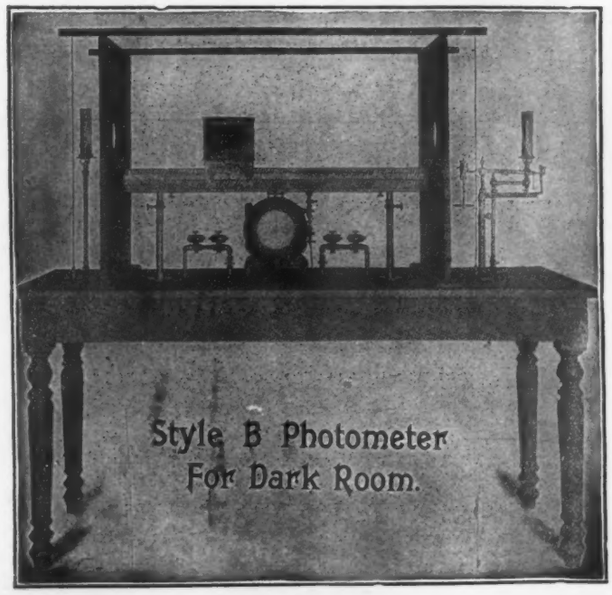
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Fri.	1	12.50 AM	3.30 AM
Sat.	2	1.30	3.30
Sun.	3	2.10	3.30
Mon.	4	2.50	3.30
Tue.	5	No L.	No L.
Wed.	6	No L.FM	No L.
Thu.	7	No L.	No L.
Fri.	8	8.00 PM	10.20 PM
Sat.	9	8.00	11.20
Sun.	10	8.00	12.00
Mon.	11	8.00	12.40 AM
Tue.	12	8.00	1.10
Wed.	13	8.00 LQ	1.40
Thu.	14	8.00	2.10
Fri.	15	8.00	2.40
Sat.	16	8.00	3.10
Sun.	17	8.00	3.30
Mon.	18	8.00	3.30
Tue.	19	8.00	3.30
Wed.	20	8.00	3.30
Thu.	21	8.00 NM	3.30
Fri.	22	8.00	3.30
Sat.	23	8.00	3.30
Sun.	24	8.00	3.30
Mon.	25	8.00	3.30
Tue.	26	9.50	3.30
Wed.	27	10.20	3.30
Thu.	28	11.00	3.30
Fri.	29	11.30 FQ	3.30
Sat.	30	12.00	3.30

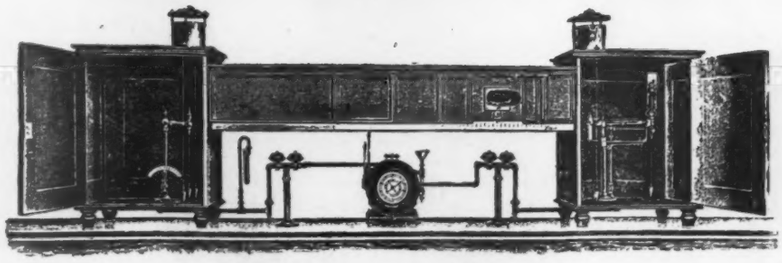
TOTAL HOURS DURING 1906.

By Table No. 1.

	Hrs.Min.
January	223.40
February	190.40
March	192.10
April	167.00
May	152.20
June	142.10
July	150.20
August	157.40
September	170.00
October	185.10
November	201.40
December	214.00
Total, yr.	2146.50







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

JUNE, 1906.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. All Night Lighting. Light	Extinguish.
		P. M.	A. M.
Fri.	1	7.15	3.15
Sat.	2	7.15	3.15
Sun.	3	7.15	3.15
Mon.	4	7.25	3.15
Tue.	5	7.25	3.15
Wed.	6	7.25	3.15
Thu.	7	7.25	3.15
Fri.	8	7.25	3.15
Sat.	9	7.25	3.15
Sun.	10	7.25	3.15
Mon.	11	7.25	3.15
Tue.	12	7.25	3.15
Wed.	13	7.25	3.15
Thu.	14	7.25	3.15
Fri.	15	7.25	3.15
Sat.	16	7.25	3.15
Sun.	17	7.25	3.15
Mon.	18	7.30	3.15
Tue.	19	7.30	3.15
Wed.	20	7.30	3.15
Thu.	21	7.30	3.15
Fri.	22	7.30	3.15
Sat.	23	7.30	3.15
Sun.	24	7.30	3.15
Mon.	25	7.30	3.15
Tue.	26	7.30	3.15
Wed.	27	7.30	3.15
Thu.	28	7.30	3.15
Fri.	29	7.30	3.15
Sat.	30	7.30	3.15

TOTAL HOURS DURING 1906.

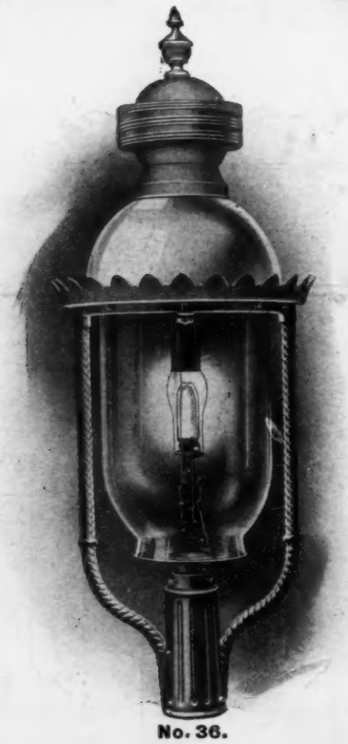
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

THE NEW NO. 7 WELSBACH DINING ROOM FIXTURE.

PRICE, EACH, COMPLETE, WITH SHADE, FRINGE, MANTLE AND CHIMNEY, $14. PER DOZ., $150. DISCOUNT, 50 PER CT.

Standard Leng h, 30 inches.
The New No. 7 Welsbach Dining Room Fixture, when ordered, will be sent complete, as follows:

1 No. 7 Harp Fixture and Brass Crown finished in Brushed Brass.
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1 No. 4 Pilot By-pass.
1 No. 4197 Mantle — Intensive Brand.
1 No. 306 Chimney (air hole).
1 Fourteen-inch GREEN Art Glass Shade, with six-inch Green Beaded Fringe.

This fixture is being largely used by Gas Companies as a dining room fixture at the popular retail price of $10 complete, and is a great favorite for moderate sized two and three-story residences. In popularity and price it is unequalled.

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Finished in oxidized copper, oxidized brass, etc., 25 cents extra.

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Special colors require a few days extra time to fill orders.

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For the Year Ending December 31st, 1905, has been Awarded Contracts for 40 Sets of

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Pottsville, Pa. (2d contract).
Evansville, Ind. (2d contract).
Lansdale, Pa.
Hempstead, N. Y. (2d contract).
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Hamilton, O. (2d contract).
Indianapolis, Ind. (2d contract).
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Hazleton, Pa.
Mahanoy City, Pa.
Ludington, Mich.
Ossining, N. Y.
Lancaster, Pa.
Flushing, N. Y. (2d contract).
South Bend, Ind.
Fall River, Mass. (2d contract).
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TOTAL SETS TO DECEMBER 31, 1905, ... 593
TOTAL DAILY CAPACITY TO DECEMBER 31, 1905, 463,780,000 CU. FT.

The United Gas Improvement Company,

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Established 1858. Incorporated 1890.
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For the Repair of Clay and Iron Retorts & Firebrick Work, for the Protection of Ironwork when Exposed to a High Degree of Heat, and Excellent for Mouthpiece Joints.

In General Use in the United States and Canada.
Unlike Expensive Preparations,
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Manhattan Fire Brick and Enameled Fire Clay Retort Works.

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Modern Coal Gas Benches,

With either Horizontal or Inclined Retorts, Half-Depth and Full-Depth Recuperative Furnaces.

ADAM WEBER PATENTS

STANDARD BENCH IRONWORK.

Linings for Water Gas Apparatus, High Grade Fire Brick of All Shapes and Sizes, Ground Fire Clay, Ground Fire Brick in Bulk or in Barrels.

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BENCH SETTINGS,

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GEROULD'S IMPROVED RETORT CEMENT

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In Kegs, 100 to 200 " " 6 " "
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These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

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Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,

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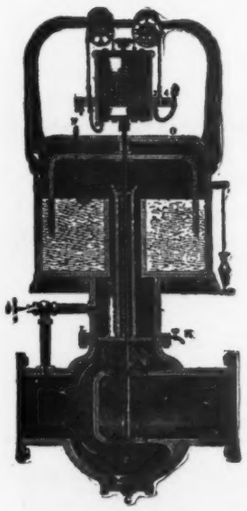
CONNELLY IRON SPONGE AND GOVERNOR CO.,



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Automatic, Balance, High Pressure and Service Governors,

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INSTALLATION OF SMOKELESS TAR BURNING SYSTEM.

Reinforced Concrete Construction for all Purposes.

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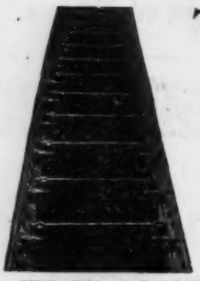

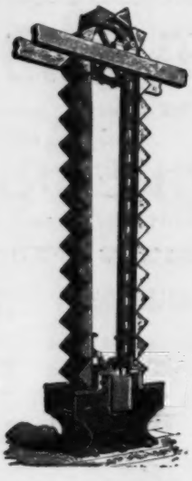

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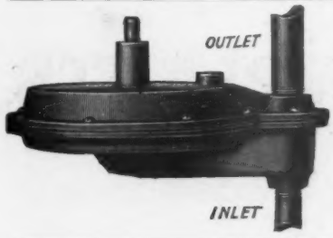

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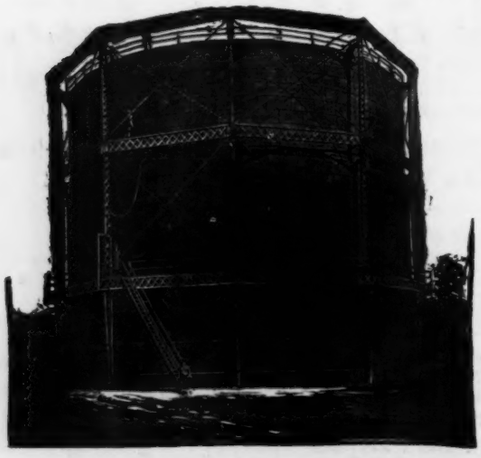

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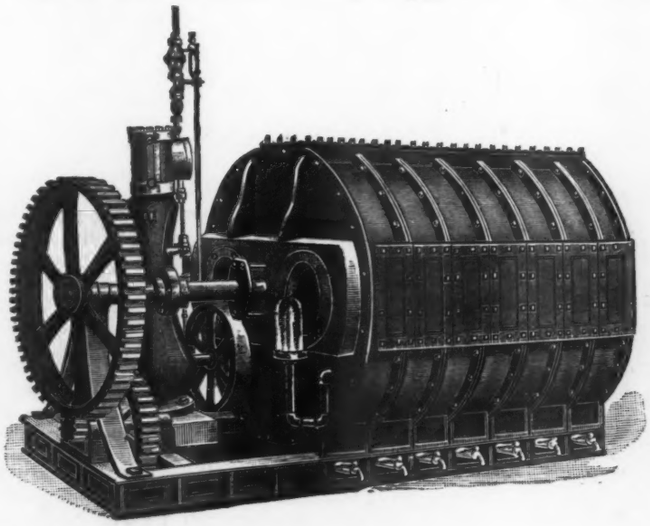

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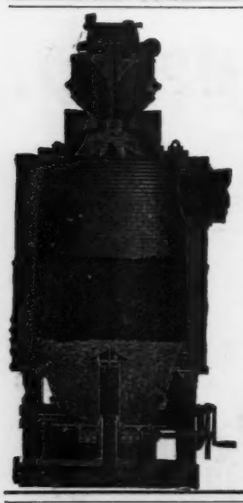

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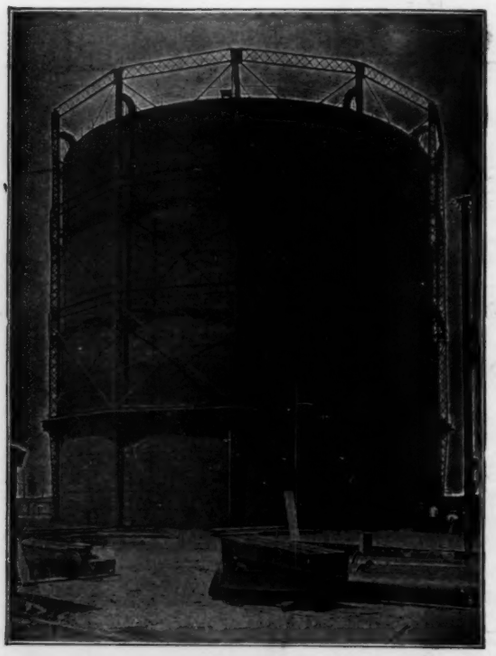

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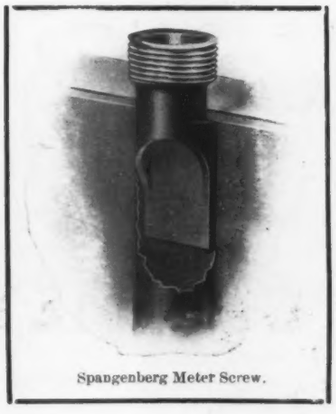

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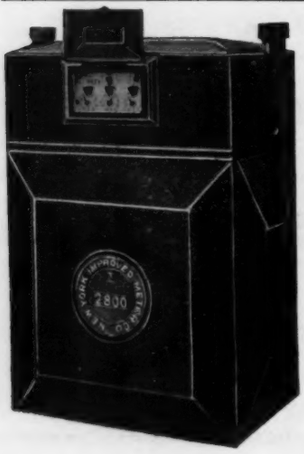

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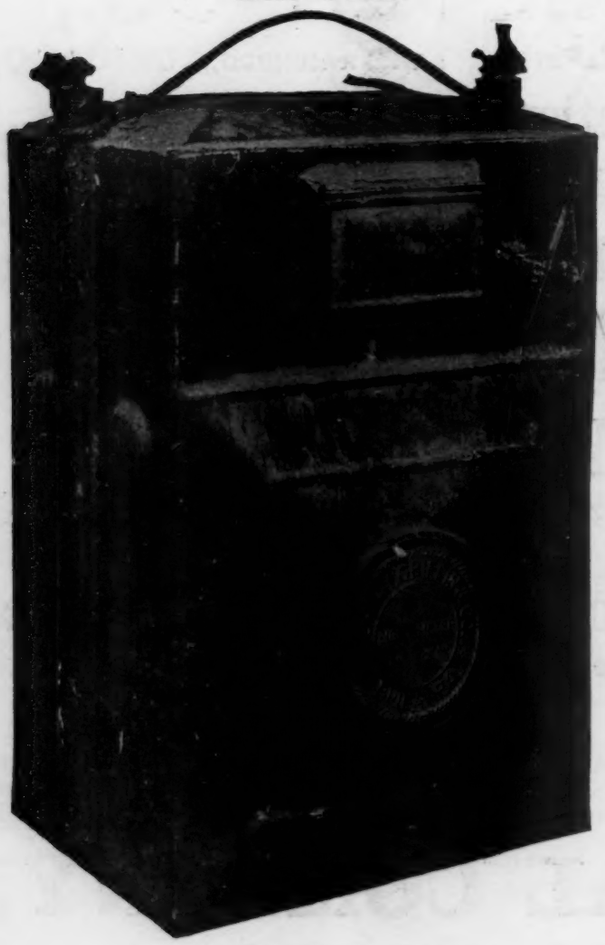

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